Abstract
tcolorbox provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part. The package tcolorbox can be used for the setting of \LaTeX examples where one part of the box displays the source code and the other part shows the output. Another common use case is the setting of theorems. The package supports saving and reuse of source code and text parts.
4.13 Floating Objects ................................................. 79
4.14 Embedding into the Surroundings .................. 81
4.15 Bounding Box ....................................................... 88
   4.15.1 Shifting Bounding Box Borders ................. 88
   4.15.2 Box Alignment ........................................ 91
   4.15.3 Toggle Enlargements .............................. 92
   4.15.4 Spread Box to Page Borders .................. 93
   4.15.5 Box Extrusion ...................................... 95
4.16 Layered Boxes and Every Box Settings .............. 97
4.17 Capture Mode .................................................. 100
4.18 Text Characteristics ........................................ 101
4.19 Files .......................................................... 102
4.20 \textcolorbox Specials ............................. 102
4.21 Counters, Labels, and References ........................ 104
4.22 Even and Odd Pages ..................................... 107
4.23 Externalization ............................................... 111
4.24 Miscellaneous .............................................. 112
5 Initialization Option Keys .................................. 114
   5.1 Numbered Boxes ....................................... 114
   5.2 Lists of 
        \textcolorboxes .................................. 121
6 Side by Side ...................................................... 123
   6.1 Basic Settings .......................................... 123
   6.2 Advanced Settings from the \textbarxparse Library .... 129
7 Saving and Loading of Verbatim Texts ...................... 133
8 Recording .......................................................... 135
   8.1 Macros ...................................................... 135
   8.2 Options ...................................................... 135
   8.3 Example: Exercises .................................... 136
   8.4 Example: Solutions .................................... 139
9 Technical Overview and Customization .................. 141
   9.1 Skins and Drawing Engines ....................... 141
   9.2 Code Option Keys ..................................... 145
   9.3 Subskins ................................................... 148
   9.4 Drawing Scheme ....................................... 149
   9.5 Color Names ............................................. 153
   9.6 Useful Properties ..................................... 154
10 Library \textbar skins ........................................ 156
   10.1 Style Option Keys ................................ 156
   10.2 Boxed Title Option Keys ......................... 163
      10.2.1 Boxed Title Placement .................. 163
      10.2.2 Options for the Boxed Title Placement .... 166
      10.2.3 Options for the Boxed Title Box .......... 167
   10.3 Watermark Option Keys ..................................... 174
   10.4 Clip Environments ..................................... 181
   10.5 Border Line Option Keys ............................ 186
   10.6 Shadow Option Keys .................................. 191
      10.6.1 Common Shadows and Halos .......... 191
1 Introduction

The package originates from the first edition of my book «\LaTeX– Einführung in das Textatzsystems» [18] in about 2006. For the \LaTeX examples and tutorials given there, I wanted to have accentuated and colored boxes to display source code and compiled text in combination. Since, in my opinion, this type of boxes is also quite useful to highlight definitions and theorems, I applied them for my lecture notes in mathematics [19–21] as well. With this package, you are invited to apply these boxes for similar projects.

The breaking news for version 2.00 was the support for breakable boxes. This feature allows new applications of the package without affecting the core package too much if you do not need boxes to break automatically. With version 2.20, the often requested “side by side” mode for listings has been added. With version 3.00, boxed titles are introduced together with improved customization options for overlays, underlays, finishes, and own code extensions.

Since the first public release in 2011, I received a lot of feedback from all over the world. I want to thank all who wrote me for supporting this package by sending bug reports and ideas for new or better features.

1.1 Installation

Typically, \texttt{tcolorbox} will be installed as part of a major \LaTeX distribution and there is nothing special to do for a user.

If you intend to make a local installation \textit{by hand}, see the \texttt{README} file of the \texttt{tcolorbox} package for some hints. The short story is: you have to install not only \texttt{tcolorbox.sty}, but also all \texttt{*.code.tex} files in the local \texttt{texmf} tree.

1.2 Loading the Package

The base package \texttt{tcolorbox} loads the packages \texttt{pgf} [22], \texttt{verbatim} [17], \texttt{etoolbox} [7], and \texttt{environ} [16]. \texttt{tcolorbox} itself is loaded in the usual manner in the preamble:

\begin{verbatim}
\usepackage{tcolorbox}
\end{verbatim}

The package takes option keys in the key-value syntax. Alternatively, you may use these keys later in the preamble with \texttt{\tcbuselibrary} \texttt{P.9} (see there). For example, the key to typeset listings is:

\begin{verbatim}
\usepackage[listings]{tcolorbox}
\end{verbatim}
1.3 Libraries

The base package \texttt{tcolorbox} is extendable by program libraries. This is done by using option keys while loading the package or inside the preamble by applying the following macro with the same set of keys.

\begin{verbatim}
\ tcbuselibrary{(key list)}
\end{verbatim}

Loads the libraries given by the \textit{(key list)}.

\begin{verbatim}
\ tcbuselibrary{listings, theorems}
\end{verbatim}

The following keys are used inside \texttt{tcbuselibrary} respectively \texttt{\usepackage} without the key tree path /\texttt{tcb/library}/.

\texttt{/tcb/library/skins} \hspace{1cm} \texttt{(skins)}

Loads the package \texttt{tikz} [22] and provides additional styles (skins) for the appearance of the colored boxes; see Section 10 from page 156.

\texttt{/tcb/library/vignette} \hspace{1cm} \texttt{(vignette)}

Provides code for more ornamental; see Section 15 from page 285.

\texttt{/tcb/library/raster} \hspace{1cm} \texttt{(raster)}

Provides additional macros and options for typesetting multiple boxes arranged in a kind of raster; see Section 16 from page 298.

\texttt{/tcb/library/listings} \hspace{1cm} \texttt{(listings)}

Loads the package \texttt{listings} [6] and provides additional macros for typesetting listings which are described in Section 17 from page 320.

\texttt{/tcb/library/listingsutf8} \hspace{1cm} \texttt{(listingsutf8)}

Loads the packages \texttt{listings} [6] and \texttt{listingsutf8} [11] for UTF-8 support. This is a variant of the library \texttt{listings} and is described in Section 17 from page 320.

\texttt{/tcb/library/minted} \hspace{1cm} \texttt{(minted)}

Loads the package \texttt{minted} [12] to typeset listings with the \texttt{Pygments} [14] tool, also see Section 17 on page 320.

\texttt{/tcb/library/theorems} \hspace{1cm} \texttt{(theorems)}

Provides additional macros for typesetting theorems which are described in Section 18 from page 362.

\texttt{/tcb/library/breakable} \hspace{1cm} \texttt{(breakable)}

Provides support for automatic box breaking from one page to another; see Section 19 on page 388.

\texttt{/tcb/library/magazine} \hspace{1cm} \texttt{(magazine)}

Provides support for storing broken box parts to be used later or in interchanged order, Section 20 on page 415.

\texttt{/tcb/library/poster} \hspace{1cm} \texttt{(poster)}

Provides support for creating posters, Section 21 on page 425.

\texttt{/tcb/library/fitting} \hspace{1cm} \texttt{(fitting)}

Provides support for font size adaption of the box content to the box dimensions; see Section 22 from page 439.

\texttt{/tcb/library/hooks} \hspace{1cm} \texttt{(hooks)}

Extends several option keys to “hookable” keys; see Section 23 from page 451.
Provides document command production with \texttt{xparse} for \texttt{tcolorbox}; see Section 24 from page 462.

Provides externalization support for stand-alone document snippets, see Section 25 on page 475.

Provides additional macros for typesetting \LaTeX{} documentations which are described in Section 26 from page 487.

Loads the libraries \texttt{skins}, \texttt{breakable}, \texttt{raster}, \texttt{hooks}, \texttt{theorems}, \texttt{fitting}, and \texttt{xparse}. Use this shortcut, if you want to use all features of \texttt{tcolorbox} with exception of typesetting listings and using the specialized \texttt{documentation} library.

Loads all libraries except \texttt{minted} and \texttt{documentation}. Use this shortcut, if you want to use all features of \texttt{tcolorbox} with exception of using the \texttt{minted} package and using the specialized \texttt{documentation} library.

Loads all libraries. Use this shortcut only, if you intend to use the \texttt{documentation} library.

### 3 Macros for Box Creation

\begin{tcolorbox}[(options)]
\begin{environment content}
\end{tcolorbox}

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts. The appearance of this box is controlled by numerous options. In the most simple case the source code

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

creates the following compiled text box:

This is a \textbf{tcolorbox}.

The text content of the box can be divided in an upper and a lower part by the command \texttt{\textbackslash tcblower}. Visually, both parts are separated by a line. For example:

\begin{tcolorbox}
This is another \textbf{tcolorbox}.
\tcblower

Here, you see the lower part of the box.
\end{tcolorbox}

This code gives the following box:

This is another \textbf{tcolorbox}.

\begin{tcolorbox}
\[colback=red!5!white,colframe=red!75!black,title=My nice heading]\This is another \textbf{tcolorbox}.
\tcblower

Here, you see the lower part of the box.
\end{tcolorbox}

My nice heading

This is another \textbf{tcolorbox}.

\begin{tcolorbox}
\tcblower

Used inside \texttt{tcolorbox} to separate the upper box part from the optional lower box part. The upper and the lower part are treated as separate functional units. If you only want to draw a line, see \texttt{\textbackslash tccline} \textsuperscript{p. 221}.
\tcbset\{\langle options\rangle\}

Sets options for every following \texttt{tcolorbox}\textsuperscript{P.12} inside the current \TeX\ group. By default, this does not apply to nested boxes, see Section 4.16 on page 97.

For example, the colors of the boxes may be defined for the whole document by this:

\begin{center}
\begin{tcolorbox}
\texttt{tcbset\{colback=red!5!white, colframe=red!75!black\}}
\end{tcolorbox}
\end{center}

\tcbsetforeverylayer\{\langle options\rangle\}

Sets options for every following \texttt{tcolorbox}\textsuperscript{P.12} inside the current \TeX\ group. In contrast to \texttt{tcbset}, this does also apply to nested boxes, see Section 4.16 on page 97. Technically, the \langle options\rangle\ are appended to the default values for every tcolorbox which are applied by /tcb/reset\textsuperscript{P.112}.

You should not use this macro, if you are not completely sure that you want to have the \langle options\rangle\ also for boxes in boxes (in boxes in boxes \ldots).

\begin{center}
\begin{tcolorbox}
\texttt{tcbset\{colback=green!10!white\}}
\texttt{tcbsetforeverylayer\{colframe=red!75!black\}}
\begin{tcolorbox}[title=All options for this box]
This is a tcolorbox. \par\medskip
\begin{tcolorbox}[title=Nested box]
Note that this nested box has a red frame but no green background.
\end{tcolorbox}
\end{tcolorbox}
\begin{tcolorbox}
\texttt{reset}\par

Options given with \texttt{tcbsetforeverylayer} survive a \texttt{reset}.
\end{tcolorbox}
\end{tcolorbox}
\end{center}
\texttt{\texttt{tcolorbox}[\{options\}]}{\langle box content\rangle}

Creates a colored box which is fitted to the width of the given \langle box content\rangle. In principle, most \langle options\rangle for a \texttt{tcolorbox} → P.12 can be used for \texttt{tcolorbox} with some restrictions. A \texttt{tcolorbox} cannot have a lower part and cannot be broken.

\begin{verbatim}
\tcbset{colframe=blue!50!black,colback=white,colupper=red!50!black,
 \fonttitle=\bfseries,nobeforeafter,center title}
\begin{tcolorbox}
\begin{tabular}{r|c|l}
One & Two & Three \\
\hline
Men & Mice & Lions \\
\hline
Upper & Middle & Lower
\end{tabular}
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
\includegraphics[width=5cm]{Basilica_5.png}
\end{verbatim}

\begin{verbatim}
\tcbox[tcbox raise base]{Hello World}\fill
\tcbox[left=0mm,right=0mm,top=0mm,bottom=0mm,boxsep=0mm,
toptitle=0.5mm,bottomtitle=0.5mm,title=My table]{%\arrayrulecolor{blue!50!black}\renewcommand{\arraystretch}{1.2}%\begin{tabular}{r|c|l}
One & Two & Three \\
\hline
Men & Mice & Lions \\
\hline
Upper & Middle & Lower
\end{tabular}{%}
\end{verbatim}

\begin{verbatim}
\tcbox[colback=blue!85!black,
left=0mm,right=0mm,top=0mm,bottom=0mm,boxsep=1mm,arc=0mm,boxrule=0.5pt,
title=My picture]{%\includegraphics[width=5cm]{Basilica_5.png}}
\end{verbatim}

\begin{verbatim}
% usepackage{tikz}
\tcbset{colframe=blue!50!black,colback=white,colupper=red!50!black,
\fonttitle=\bfseries,center title}
\begin{tcolorbox}
Hello World!
\end{tcolorbox}
\begin{tcolorbox}[Hello World!]
\end{tcolorbox}
\begin{tcolorbox}[Hello World!]
\end{tcolorbox}
\end{verbatim}
See Section 24.2 on page 464 and Section 24.3 on page 467 for more elaborate methods to create new environments and commands.

\newtcolorbox{(init options)}{(name)}{(number)}{(default)}{(options)}

Creates a new environment \texttt{(name)} based on \texttt{tcolorbox}\textsuperscript{P.12}. Basically, \texttt{\newtcolorbox} operates like \texttt{\newenvironment}. This means, the new environment \texttt{(name)} optionally takes \texttt{(number)} arguments, where \texttt{(default)} is the default value for the optional first argument. The \texttt{(options)} are given to the underlying \texttt{tcolorbox}. Note that \texttt{/tcb/savedelimiter}\textsuperscript{P.26} is set to the given \texttt{(name)} automatically. The \texttt{(init options)} allow setting up automatic numbering, see Section 5 from page 114.

\begin{tcolorbox}[mybox]{colback=red!5!white, colframe=red!75!black}
\begin{mybox}
This is my own box.
\end{mybox}
\end{tcolorbox}

\begin{tcolorbox}[mybox]{colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries, title=\texttt{(1)}}
\begin{mybox}{Hello there}
This is my own box with a mandatory title.
\end{mybox}
\end{tcolorbox}

\begin{tcolorbox}[mybox]{colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries, title=\texttt{(2)}}
\begin{mybox}{colback=yellow}{Hello there}
This is my own box with a mandatory title and options.
\end{mybox}
\end{tcolorbox}

\begin{tcolorbox}[auto counter,number within=section]{pabox}{colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries, title=Examp.~\thetcbcounter: \texttt{#1}}
\begin{pabox}{colback=yellow}{Hello there}
This is my own box with a mandatory numbered title and options.
\end{pabox}
\end{tcolorbox}

\renewtcolorbox{(init options)}{(name)}{(number)}{(default)}{(options)}

Operates like \texttt{\newtcolorbox}, but based on \texttt{\renewenvironment} instead of \texttt{\newenvironment}. An existing environment is redefined.
\newtcbox{\langle init options \rangle}{\langle name \rangle}{\langle number \rangle}{\langle default \rangle}{\langle options \rangle}

Creates a new macro \langle name \rangle based on \texttt{tcbox}\textsuperscript{P.14}. Basically, \texttt{newtcbox} operates like \texttt{newcommand}. The new macro \langle name \rangle optionally takes \langle number \rangle+1 arguments, where \langle default \rangle is the default value for the optional first argument. The \langle options \rangle are given to the underlying \texttt{tcbox}. The \langle init options \rangle allow setting up automatic numbering, see Section 5 from page 114.

\begin{verbatim}
\begin{minipage}{0.5\textwidth}
\newtcbox{\mybox}{colback=red!5!white, colframe=red!75!black}
\mybox{This is my own box.}
\end{minipage}
\begin{minipage}{0.5\textwidth}
This is my own box.
\end{minipage}
\end{verbatim}

\begin{verbatim}
\begin{minipage}{0.5\textwidth}
\newtcbox[\mybox][1]{colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries, title={#1}}
\mybox[Hello there]{This is my own box.}
\end{minipage}
\begin{minipage}{0.5\textwidth}
Hello there
This is my own box.
\end{minipage}
\end{verbatim}

\begin{verbatim}
\begin{minipage}{0.5\textwidth}
\newtcbox[\mybox][2],[]{colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries, title={#2},#1}
\mybox[\textcolor{yellow}]{Hello there}
\end{minipage}
\begin{minipage}{0.5\textwidth}
Hello there
This is my own box.
\end{minipage}
\end{verbatim}

\begin{verbatim}
\begin{minipage}{0.5\textwidth}
\renewtcbox{\pbbox}[use counter from=pabox][2],[]{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, title=(\thetcbcounter) #2,#1}
\pbbox[\textcolor{yellow}]{Hello there}
\end{minipage}
\begin{minipage}{0.5\textwidth}
(3.2) Hello there
This is my own box.
\end{minipage}
\end{verbatim}

\begin{verbatim}
\newtcbox[\mybox][1][\textcolor{red}]{on line, arc=0pt,outer arc=0pt, colback=\#1!10!white,colframe=\#1!50!black, boxsep=0pt,left=1pt,right=1pt,top=2pt,bottom=2pt, boxrule=0pt,bottomrule=1pt,toprule=1pt}
\newtcbox[\xmybox][1][\textcolor{red}]{on line, arc=7pt,colback=\#1!10!white,colframe=\#1!50!black, before upper={\rule[-3pt]{0pt}{10pt}},boxrule=1pt, boxsep=0pt,left=6pt,right=6pt,top=2pt,bottom=2pt}
\end{verbatim}

\begin{verbatim}
\mybox[\textcolor{green}]{quick} brown \mybox[\textcolor{brown}]{fox} \mybox[\textcolor{blue}]{jumps} over the \mybox[\textcolor{green}]{lazy} \mybox[\textcolor{brown}]{dog}. \texttt{par}
\end{verbatim}

\begin{verbatim}
\xmybox[\textcolor{green}]{quick} brown \xmybox[\textcolor{brown}]{fox} \xmybox[\textcolor{blue}]{jumps} over the \xmybox[\textcolor{green}]{lazy} \xmybox[\textcolor{brown}]{dog}.
\end{verbatim}

\begin{verbatim}
\renewtcbox{\langle init options \rangle}{\langle name \rangle}{\langle number \rangle}{\langle default \rangle}{\langle options \rangle}

Operates like \texttt{newtcbox}, but based on \texttt{renewcommand} instead of \texttt{newcommand}. An existing macro is redefined.
\end{verbatim}
\tcolorboxenvironment{(name)}{(options)}

An existing environment \langle name \rangle is redefined to be boxed inside a tcolorbox with the given \langle options \rangle.

\begin{tcolorbox}
\begin{myitemize}
\item Alpha
\item Beta
\item Gamma
\end{myitemize}
\end{tcolorbox}

Some text.

See further examples in Section 18.4 on page 387.
4 Option Keys

For the \langle options\rangle in \texttt{tcolorbox}\footnote{P.12} respectively \texttt{\textbackslash tcbset}\footnote{P.13} the following \texttt{pgf} keys can be applied. The key tree path /tcb/ is not to be used inside these macros. It is easy to add your own style keys using the syntax for \texttt{pgf} keys, see\footnote{18, 22} or the examples starting from page 349.

4.1 Title

\texttt{/tcb/title=\langle text\rangle} \hspace{1cm} (no default, initially empty)

Creates a heading line with \langle text\rangle as content.

\begin{tcolorbox}[title=My heading line]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My heading line
This is a \textcolor{white}{tcolorbox}.

\texttt{/tcb/notitle} \hspace{1cm} (no value, initially set)

Removes the title line if set before.

\texttt{/tcb/adjusted title=\langle text\rangle} \hspace{1cm} (style, no default, initially unset)

Creates a heading line with \langle text\rangle as content. The minimal height of this line is adjusted to fit the text given by \texttt{/tcb/adjust text}. This option makes sense for single line headings if boxes are set side by side with equal height. Note that it is very easy to trick this adjustment.

\begin{tcolorbox}
\texttt{\textbackslash tcbset\{colback=\textcolor{white}{White},arc=0mm,width=(\textwidth-4pt)/4,}
\texttt{equal height group=AT,before=,after=\textbackslash hfill,fonttitle=\textbf{series}\}
\begin{quote}
The following titles are not adjusted:\\%
\begin{verbatim}
\foreach \n in {xxx,ggg,AAA,\textquote{Agypten}}
{\begin{tcolorbox}[title=\n,colframe=red!75!black]
Some content.\end{tcolorbox}}
\end{verbatim}
\end{quote}
\begin{quote}
Now, we try again with adjusted titles:\\%
\begin{verbatim}
\foreach \n in {xxx,ggg,AAA,\textquote{Agypten}}
{\begin{tcolorbox}[adjusted title=\n,colframe=blue!75!black]
Some content.\end{tcolorbox}}
\end{verbatim}
\end{quote}
\end{tcolorbox}

The following titles are not adjusted:

\begin{tabular}{|l|}
\hline
\textbf{xxx} & \textbf{ggg} & \textbf{AAA} & \textbf{Ägypten} \\
\hline
Some content. & Some content. & Some content. & Some content. \\
\hline
\end{tabular}

Now, we try again with adjusted titles:

\begin{tabular}{|l|}
\hline
\textbf{xxx} & \textbf{ggg} & \textbf{AAA} & \textbf{Ägypten} \\
\hline
Some content. & Some content. & Some content. & Some content. \\
\hline
\end{tabular}

\texttt{/tcb/adjust text=\langle text\rangle} \hspace{1cm} (no default, initially \textquote{\textbackslash Apgjy})

This sets the reference text for \texttt{/tcb/adjusted title}. If your texts never exceed “Äpgjy” in depth and height you don’t need to care about this option.
/tcb/squeezed title=(text) (style, no default, initially unset)

Creates a single heading line with (text) as content. If the (text) is longer than the available space, the text is squeezed to fit into the available space.

\begin{tcbitemize}
  \tcbitem[squeezed title={Short title}]
    First box
  \tcbitem[squeezed title={This is a very very long title}]
    Second box
  \tcbitem[squeezed title={This title is clearly to long for this application}]
    Third box
\end{tcbitemize}

끔

/tcb/squeezed title*=text (style, no default, initially unset)

This is a combination of /tcb/adjusted title \textsuperscript{P.18} and /tcb/squeezed title.

\begin{tcbitemize}
  \tcbitem[squeezed title*={Short title}]
    First box
  \tcbitem[squeezed title*={This is a very very long title}]
    Second box
  \tcbitem[squeezed title*={This title is clearly to long for this application}]
    Third box
\end{tcbitemize}

\textbf{This is a tcolorbox.}

/tcb/titlebox=(mode) (no default, initially visible)

Controls the treatment of the title part of the box. Feasible values for (mode) are:

- \textbf{visible}: usual type setting of the title box,
- \textbf{invisible}: empty space instead of the title contents.

\begin{tcolorbox}[title=My invisible title, titlebox=invisible]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
/tcb/detach title

Detaches the title from its normal position. The text of the title is stored into \tcbtitlertext and the formatted title is available by \tcbtitile. The main application is to move the title from its usual place to another one.

\begin{mybox}[detach title]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[detach title, after upper={\par\hfill \tcbtitile}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[detach title, before upper=\tcbtitile]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

/tcb/attach title

Attaches the title to its normal position. This option is used to reverse /tcb/detach title.

/\textit{tcb/attach title to upper=(text)}

Attaches the title to the begin of the upper part of the box content. The optional \textit{text} is set between the formatted title and the box content.

\begin{mybox}[attach title to upper={\ ---\ }]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[attach title to upper,after title={:\ }]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[attach title to upper]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

More title options are documented in Section 4.11 on page 64 and Section 10.2 on page 163.
4.2 Subtitle

Inside the box content, one or more subtitles can be added. In general, a subtitle is a further `\tcolorbox` which inherits some color and geometry options from the enclosing box. It may be customized just like any other `\tcolorbox`.

\texttt{\textbackslash tocbsubtitle\{}\langle\text\rangle\}\{\langle\text\rangle\}

Used inside a `\tcolorbox` to add a subtitle box with the given \langle\text\rangle. This is an independent `\tcolorbox` which is formatted by several inherited properties of the enclosing box, by further settings from `/tcb/subtitle style`, and by the given \langle\text\rangle.

\begin{tcolorbox}
[title=My title, 
colback=red!5!white, 
colframe=red!75!black, 
fonttitle=\bfseries]
  This is a \textbf{tcolorbox}.
  tocbsubtitle\{before skip=\baselineskip\%
  \{My subtitle\}
  Further text.
\end{tcolorbox}

My title
This is a tcolorbox.
My subtitle
Further text.

\begin{tcolorbox}
[title=My title, 
colback=red!5!white, 
colframe=red!75!black, 
colbacktitle=yellow!50!red, 
coltitle=red!25!black, 
fonttitle=\bfseries]
  This is a \textbf{tcolorbox}.
  tocbsubtitle\{before skip=\baselineskip\%
  \{My subtitle\}
  Further text.
\end{tcolorbox}

My title
This is a tcolorbox.
My subtitle
Further text.

\begin{tcolorbox}
[title=My title, 
colback=red!5!white, 
colframe=red!75!black, 
colbacktitle=yellow!50!red!25!white, 
fonttitle=\bfseries, 
subtitle style={boxrule=0.4pt, 
colback=yellow!50!red!25!white} ]
  This is a \textbf{tcolorbox}.
  tocbsubtitle\{My subtitle\}
  Further text.
  tocbsubtitle\{Second subtitle\}
  Further text.
\end{tcolorbox}

My title
This is a tcolorbox.
My subtitle
Further text.
Second subtitle
Further text.

\texttt{\textbackslash tcb/subtitle style\{}\langle\text\rangle\}

(no default, initially empty)

Adds `\tcolorbox` \langle\text\rangle to the settings for `tocbsubtitle`. 
4.3 Upper Part

The text content of a \texttt{tcolorbox} may be parted into a mandatory upper part and an optional lower part. These parts are separated by \texttt{tcblower}. If there is no \texttt{tcblower} present, there is no lower part and the upper part forms the complete text content.

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

This is the lower part.

\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\texttt{tcblower}
This is the lower part.
\end{tcolorbox}

\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\texttt{tcblower}
This is the lower part.
\end{tcolorbox}

\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\texttt{tcblower}
This is the lower part.
\end{tcolorbox}

\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}
/tcb/saveto=⟨file name⟩

(no default, initially empty)

Saves the content of the box into a file for an optional later usage. This is the counterpart of /tcb/savelowerto \textsuperscript{P.24}, but is saves not only the upper part but the whole content. If a lower part is present, it is also saved including \texttt{\texttt{tcblower}} \textsuperscript{P.12}.

\begin{tcolorbox}\[invisible,saveto=\jobname_mysave1.tex,colback=white\]
This is a \textbf{tcolorbox} which seems to be empty. The content is saved for later usage.
\end{tcolorbox}

Now, we load the saved text:\
\texttt{\input{\jobname_mysave1.tex}}

This is a tcolorbox which seems to be empty. The content is saved for later usage.

\begin{tcolorbox}[saveto=\jobname_mysave2.tex]
This is a \textbf{tcolorbox}.
\texttt{tcblower}
This is the lower part.
\end{tcolorbox}

Now, we load the saved text:
\begin{tcolorbox}[colframe=red,colback=red!10,coltitle=black,colbacktitle=red!20,sidebyside,title=Here we see the saved content including the lower part]\texttt{\input{\jobname_mysave2.tex}}\end{tcolorbox}

This is a tcolorbox. This is the lower part.

Now, we load the saved text:
\texttt{\input{\jobname_mysave2.tex}}

This is a tcolorbox. This is the lower part.
4.4 Lower Part

\texttt{/tcb/lowerbox=\langle mode \rangle} \quad \text{(no default, initially visible)}

Controls the treatment of the lower part of the box. Feasible values for \texttt{\langle mode \rangle} are:

- \texttt{visible}: usual type setting of the lower part,
- \texttt{invisible}: empty space instead of the lower part contents,
- \texttt{ignored}: the lower part is not used (here).

The last two values are usually applied in connection with \texttt{savelowerto}.

\begin{tcolorbox}[lowerbox=invisible,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[lowerbox=ignored,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part (but ignored).
\end{tcolorbox}

\texttt{/tcb/savelowerto=\langle file name \rangle} \quad \text{(no default, initially empty)}

Saves the content of the lower part into a file for an optional later usage.

\begin{tcolorbox}[lowerbox=invisible,savelowerto=\jobname_bspsave.tex,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part which may be quite complex:
$\displaystyle f(x) = \frac{1+x^2}{1-x^2}$.
\end{tcolorbox}

Now, we load the saved text:\
\input{\jobname_bspsave.tex}

This is a \textbf{tcolorbox}.

Now, we load the saved text:
This is the lower part which may be quite complex: $f(x) = \frac{1+x^2}{1-x^2}$.
If set to `true`, the lower part is visually separated from the upper part. It depends on the chosen skin how the visualization of the separation is done.

```latex
\begin{tcbraster}
\begin{tcolorbox}[title=Lower separated]
This is the upper part.
This is the lower part.
\end{tcolorbox}
\begin{tcolorbox}[title=Lower not separated,lower separated=false]
This is the upper part.
This is the lower part.
\end{tcolorbox}
\begin{tcolorbox}[sidebyside,title=Lower separated]
This is the upper part.
This is the lower part.
\end{tcolorbox}
\begin{tcolorbox}[sidebyside,title=Lower not separated,lower separated=false]
This is the upper part.
This is the lower part.
\end{tcolorbox}
\begin{tcolorbox}[beamer,title=Lower separated]
This is the upper part.
This is the lower part.
\end{tcolorbox}
\begin{tcolorbox}[beamer,title=Lower not separated,lower separated=false]
This is the upper part.
This is the lower part.
\end{tcolorbox}
\end{tcbraster}
```
/tcb/savedelimiter=(name) (no default, initially tcolorbox)

Used in connection with new environment definitions which extend \texttt{tcolorbox} and use or allow the option \texttt{savelowerto}. To catch the end of the new box environment \texttt{(name)} has to be the name of this environment. Additionally, the environment definition has to use \texttt{\begin{tcolorbox}} instead of \texttt{\begin{tcolorbox}} and \texttt{\end{tcolorbox}} instead of \texttt{\end{tcolorbox}}.

\begin{mybox}{My Example}
Upper part.
\tcblower
Saved lower part!
\end{mybox}

Now, the saved part is used:
\begin{tcolorbox}[colback=green!5]
\input{\jobname_bspsave2.tex}
\end{tcolorbox}

The \texttt{savedelimiter} is used implicitly with \texttt{\newtcolorbox}\texttt{\footnotesize P.15} which allows a more convenient usage:

\begin{mybox}{My Example}
Upper part.
\tcblower
Saved lower part!
\end{mybox}

Now, the saved part is used:
\begin{tcolorbox}[colback=green!5]
\input{\jobname_bspsave2.tex}
\end{tcolorbox}
4.5 Colors and Fonts

/\texttt{tcb/colframe}\verb|=(color)| (no default, initially \texttt{black!75!white})

Sets the frame \texttt{(color)} of the box.

\begin{tcolorbox}[colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

/\texttt{tcb/colback}\verb|=(color)| (no default, initially \texttt{black!5!white})

Sets the background \texttt{(color)} of the box.

\begin{tcolorbox}[colback=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

Also see /\texttt{tcb/colbacklower} → P.232 of the \texttt{skins} library.

/\texttt{tcb/title\_filled}\verb|=(true|false) (default \texttt{true}, initially \texttt{false})

Switches the drawing of the title background according to the given value. This option is set to \texttt{true} automatically by /\texttt{tcb/colbacktitle}, /\texttt{tcb/opacitybacktitle} → P.51, and /\texttt{tcb/title\_style} → P.159, and /\texttt{tcb/title\_code} → P.147.

\begin{tcolorbox}[title=My title, title\_filled]\verb|=(true|false]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title

This is a \textbf{tcolorbox}.

/\texttt{tcb/colbacktitle}\verb|=(color)| (no default, initially \texttt{black!50!white})

Sets the background \texttt{(color)} of the title area of the box.

\begin{tcolorbox}[colbacktitle=red!50!white, title=My title, coltitle=black, fonttitle=bfseries]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title

This is a \textbf{tcolorbox}.
\begin{tcolorbox}[colupper=red!75!black]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

\begin{tcolorbox}[collower=red!75!black]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

\begin{tcolorbox}[coltext=red!75!black]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

\begin{tcolorbox}[coltitle=red!75!black, colbacktitle=black!10!white, title=Test]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
Sets `<text>` before the content of the upper part (e.g. font settings).

\begin{tcolorbox}[fontupper=Hello!~\sffamily]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Hello! This is a \textbf{tcolorbox}.

Sets `<text>` before the content of the lower part (e.g. font settings).

\begin{tcolorbox}[fontlower=\sffamily\bfseries]
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

This is the lower part.

Sets `<text>` before the content of the title text (e.g. font settings).

\begin{tcolorbox}[fonttitle=\sffamily\bfseries\large,title=Hello]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Hello

This is a \textbf{tcolorbox}.

More color options are provided by using skins documented in Section 10 from page 156.
4.6 Text Alignment

N 2015-05-07

/\texttt{tcb/halign}=⟨alignment⟩ (no default, initially justify)

If there is no lower part, \texttt{halign} determines the horizontal ⟨alignment⟩ of the text content. Otherwise, \texttt{halign} determines the horizontal ⟨alignment⟩ of the upper part of the box only. The feasible values for ⟨alignment⟩ are more or less identical to the corresponding \texttt{/tikz/align} settings, even if the implementation differs.

- justify: usual left and right justified type setting.
- left: left border justification in analogy to plain \TeX.
- flush left: left border justification with \texttt{\raggedright} of \LaTeX.
- right: right border justification in analogy to plain \TeX.
- flush right: right border justification with \texttt{\raggedleft} of \LaTeX.
- center: centering in analogy to plain \TeX.
- flush center: centering with \texttt{\centering} of \LaTeX.

The differences between the flush and non-flush version are explained in detail in the \texttt{TikZ} manual [22]. The short story is that the non-flush versions will often look more balanced but with more hyphenations.

\begin{tcolorbox}[adjusted title=flush center,halign=flush center]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=flush left,halign=flush left]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=flush right,halign=flush right]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=center,halign=center]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=left,halign=left]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=right,halign upper=right]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=center,halign=flush center]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=left,halign=flush left]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=right,halign upper=flush right]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

/\texttt{tcb/halign upper}=⟨alignment⟩ (no default, initially justify)

Alias for /\texttt{tcb/halign}.
/tcb/halign lower\langle alignment\rangle

halign lower determines the horizontal \langle alignment\rangle of the lower part of the box. The feasible values for \langle alignment\rangle are the same as for /tcb/halign\rightarrow P.30.

\begin{tcbraster}[raster columns=3,fonttitle=bfseries, colback=red!5!white,colframe=red!75!black]
  \begin{tcolorbox}[adjusted title=flush center,halign lower=flush center]
    \textbf{Upper part.} \texttt{tcblower} \texttt{Lower part.}
  \end{tcolorbox}

  \begin{tcolorbox}[adjusted title=flush left,halign lower=flush left]
    \textbf{Upper part.} \texttt{tcblower} \texttt{Lower part.}
  \end{tcolorbox}

  \begin{tcolorbox}[adjusted title=flush right,halign lower=flush right]
    \textbf{Upper part.} \texttt{tcblower} \texttt{Lower part.}
  \end{tcolorbox}

  \begin{tcolorbox}[adjusted title=center,halign lower=center]
    \textbf{Upper part.} \texttt{tcblower} \texttt{Lower part.}
  \end{tcolorbox}

  \begin{tcolorbox}[adjusted title=left,halign lower=left]
    \textbf{Upper part.} \texttt{tcblower} \texttt{Lower part.}
  \end{tcolorbox}

  \begin{tcolorbox}[adjusted title=right,halign lower=right]
    \textbf{Upper part.} \texttt{tcblower} \texttt{Lower part.}
  \end{tcolorbox}
\end{tcbraster}
halign lower determines the horizontal \langle alignment\rangle of the title of the box. The feasible values for \langle alignment\rangle are the same as for /tcb/halign P.30.

\begin{tcbraster}\[raster columns=3,fonttitle=\bfseries,\]
\begin{tcolorbox}[adjusted title=flush center,halign title=flush center]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush left,halign title=flush left]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush right,halign title=flush right]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=center,halign title=center]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=left,halign title=left]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=right,halign title=right]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcbraster}

/tcb/flushleft upper  \hfill \textit{(style, no value)}
Shortcut for setting /tcb/halign P.30 to flush left.

/tcb/center upper \hfill \textit{(style, no value)}
Shortcut for setting /tcb/halign P.30 to flush center.

/tcb/flushright upper \hfill \textit{(style, no value)}
Shortcut for setting /tcb/halign P.30 to flush right.

/tcb/flushleft lower \hfill \textit{(style, no value)}
Shortcut for setting /tcb/halign lower P.31 to flush left.

/tcb/center lower \hfill \textit{(style, no value)}
Shortcut for setting /tcb/halign lower P.31 to flush center.

/tcb/flushright lower \hfill \textit{(style, no value)}
Shortcut for setting /tcb/halign lower P.31 to flush right.
Shortcut for setting \tcb/halign title \textsuperscript{\textsuperscript{P.32}} to \textit{flush left}.

Shortcut for setting \tcb/halign title \textsuperscript{\textsuperscript{P.32}} to \textit{flush center}.

Shortcut for setting \tcb/halign title \textsuperscript{\textsuperscript{P.32}} to \textit{flush right}.

The vertical alignment settings are only relevant for boxes which are larger than their natural height, see Section 4.10 on page 53.

If the height of a \texttt{tcolorbox} is not the natural height, \texttt{valign} determines the vertical \texttt{(alignment)} of the upper part. Feasible values are

- \texttt{top}: Anchor text at top.
- \texttt{center}: Anchor text at center.
- \texttt{bottom}: Anchor text at bottom.
- \texttt{scale}: Scale text vertically to fit into the available space. This is brutal and may not look very good. Consider Section 22 on page 439 alternatively.
- \texttt{scale*}: Like \texttt{scale}, but scaling is bounded by \texttt{/tcb/valign scale limit}.

For a box with natural height, these settings are meaningless.

\begin{tcolorbox}[valign=top]This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[valign=center]This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[valign=bottom]This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[valign=scale]This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[valign=scale*]This is a \textbf{tcolorbox}.
\end{tcolorbox}

Alias for \texttt{/tcb/valign}.

\begin{tcolorbox}[valign upper=bottom]This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[valign upper=center]This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[valign upper=top]This is a \textbf{tcolorbox}.
\end{tcolorbox}

This key has the same meaning for the lower part as \texttt{valign} for the upper part, i.e., it determines the vertical \texttt{(alignment)} of the lower part with feasible values \texttt{top}, \texttt{center}, \texttt{bottom}, \texttt{scale}, and \texttt{scale*}.

Sets an upper scale limit for the \texttt{scale*} setting in \texttt{/tcb/valign} and \texttt{/tcb/valign lower}. Note that this value is not reset by \texttt{/tcb/reset} \textsuperscript{\textsuperscript{P.112}}. So, changes also apply to embedded boxes.

Also see \texttt{/tcb/sidebyside align} \textsuperscript{\textsuperscript{P.124}} for alignment settings when upper part and lower part are set side-by-side.
4.7 Geometry

4.7.1 Width

\texttt{\texttt{/tcb/width=⟨length⟩}} \hspace{1cm} (no default, initially \texttt{\linewidth})

Sets the total width of the colored box to \texttt{⟨length⟩}. See also \texttt{/tcb/height} \texttt{→} P.53.

\begin{tcolorbox}
\texttt{\texttt{\tcbset{colback=red!5!white,colframe=red!75!black}}}
\begin{tcolorbox}\[width=\texttt{\linewidth/2}]
This is a \texttt{\textbf{tcolorbox}}.
\end{tcolorbox}
\end{tcolorbox}

\texttt{This is a tcolorbox.}

\texttt{N} \texttt{2014-10-31} \hspace{1cm} \texttt{\texttt{/tcb/text width=⟨length⟩}} \hspace{1cm} (style, no default)

Sets the text width of the upper part to \texttt{⟨length⟩}. See also \texttt{/tcb/text height} \texttt{→} P.54.

\begin{tcolorbox}
\texttt{\texttt{\tcbset{colback=red!5!white,colframe=red!75!black}}}
\begin{tcolorbox}[text width=4cm]
This is a \texttt{\textbf{tcolorbox}} where the text has a width of 4cm.
\end{tcolorbox}
\end{tcolorbox}

\texttt{This is a tcolorbox where the text has a width of 4cm.}

\texttt{N} \texttt{2014-11-07} \hspace{1cm} \texttt{\texttt{/tcb/add to width=⟨length⟩}} \hspace{1cm} (style, no default)

Adds \texttt{⟨length⟩} to the current total width of the colored box.

\begin{tcolorbox}
\texttt{\texttt{\tcbset{width=4cm,colback=red!5!white, colframe=red!75!black}}}
\begin{tcolorbox}
This is a \texttt{\textbf{tcolorbox}}.
\end{tcolorbox}
\begin{tcolorbox}[add to width=1cm]
This is a \texttt{\textbf{tcolorbox}}.
\end{tcolorbox}
\end{tcolorbox}

\texttt{This is a tcolorbox.}

\texttt{This is a tcolorbox.}

See Section 4.10 on page 53 for setting fixed height values.
4.7.2 Rules

/tcb/toprule=(length)  (no default, initially 0.5mm)
Sets the line width of the top rule to ⟨length⟩.

\begin{tcolorbox}[toprule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/bottomrule=(length)  (no default, initially 0.5mm)
Sets the line width of the bottom rule to ⟨length⟩.

\begin{tcolorbox}[bottomrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/leftrule=(length)  (no default, initially 0.5mm)
Sets the line width of the left rule to ⟨length⟩.

\begin{tcolorbox}[leftrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/rightrule=(length)  (no default, initially 0.5mm)
Sets the line width of the right rule to ⟨length⟩.

\begin{tcolorbox}[rightrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
/tcb/titlerule=⟨length⟩ (no default, initially 0.5mm)
Sets the line width of the rule below the title to ⟨length⟩.

\tcbset{enhanced,colback=red!5!white,colframe=red!75!black,
colbacktitle=red!90!black}
\begin{tcolorbox}[titlerule=3mm,title=This is the title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
This is the title
This is a tcolorbox.
\end{tcolorbox}

/tcb/boxrule=⟨length⟩ (style, no default, initially 0.5mm)
Sets all rules of the frame to ⟨length⟩, i.e. /tcb/toprule→P.35, /tcb/bottomrule→P.35,
/tcb/leftrule→P.35, /tcb/rightrule→P.35, and /tcb/titlerule.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[boxrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[boxrule=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

More options for drawing a /tcb/borderline→P.186 are provided by using skins documented in Section 10 from page 156.

4.7.3 Arcs
/tcb/arc=⟨length⟩ (no default, initially 1mm)
Sets the inner radius of the four frame arcs to ⟨length⟩.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[arc=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[arc=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.
This is a tcolorbox.
/tcb/circular arc

Sets /tcb/arc\textsuperscript{P.36} to match the half of the inner width of the colored box. If width and height of the box are identical, this gives a circle.

If the height of the box is smaller than the width, the result will look quite ugly.

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[width=3cm, colback=red!5!white, colframe=red!75!black, halign=center, valign=center, square, circular arc] This is a \textbf{tcolorbox}. \end{tcolorbox}

/tcb/bean arc

Sets /tcb/arc\textsuperscript{P.36} to match the smaller value of the half of the inner width and of the inner height of the colored box.

This only works for a fixed /tcb/height\textsuperscript{P.53}. Also, /tcb/bean arc must be used after width and height are set by option keys.

\begin{tcolorbox}[width=3cm, height=2cm, bean arc] Box A \end{tcolorbox}
\begin{tcolorbox}[width=2cm, height=3cm, bean arc] Box B \end{tcolorbox}

/tcb/octogon arc

Sets /tcb/arc\textsuperscript{P.36} to match $\frac{1}{2+\sqrt{2}}$ of the inner width of the colored box. If width and height of the box are identical, the interior is a regular octogon.

\begin{tcolorbox}[enhanced, size=minimal, auto outer arc, width=2.1cm, octogon arc, colback=red, colframe=white, colupper=white, fontupper=\fontsize{7mm}{7mm}\selectfont\bfseries\sffamily, halign=center, valign=center, square, arc is angular, borderline={0.2mm}{-1mm}{red} ] STOP \end{tcolorbox}
/tcb/arc is angular (no value, initially unset)

Using this options applies a patch which straightens the corners arcs of the boxes. The little arcs are replaced by little straight lines.

This patch is considered as an experimental feature. It changes some of the original TikZ code. This change may break with future updates of TikZ.

\begin{tcolorbox}[arc is angular]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[arc is curved]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\[\text{This is a tcolorbox.}\]

/tcb/arc is curved (no value, initially set)

This option resets the patch from /tcb/arc is angular. The original TikZ code is activated.

/tcb/outer arc=(length) (no default, initially unset)

Sets the outer radius of the four frame arcs to \langle length\rangle.

\begin{tcolorbox}[arc=4mm,outer arc=1mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\[\text{This is a tcolorbox.}\]

/tcb/auto outer arc (no value, initially set)

Sets the outer radius of the four frame arcs automatically in dependency of the inner radius given by /tcb/arc → P.36.
4.7.4 Spacing

\texttt{/tcb/boxsep=⟨length⟩}
(no default, initially 1mm)

Sets a common padding of ⟨length⟩ between the text content and the frame of the box. This value is added to the key values of \texttt{left}, \texttt{right}, \texttt{top}, \texttt{bottom}, and \texttt{middle} at the appropriate places.

\begin{tcolorbox} \[boxsep=5mm\]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox} \[boxsep=5mm, draft\]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\texttt{\tcbset{colback=red!5!white,colframe=red!75!black,width=(\linewidth-4mm)/2, before=,after=\hfill}}

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\texttt{\tcbset{colback=red!5!white,colframe=red!75!black}}

\begin{tcolorbox}[left=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is some text.

N 2017-02-16
\texttt{/tcb/left*=⟨length⟩}
(style, no default)

Sets \texttt{/tcb/left} such that ⟨length⟩ is the distance between the left bounding box and the text parts.

\begin{tcolorbox}
This is some text.
\end{tcolorbox}

This is some text.
/tcb/lefttitle=(length)  (no default, initially 4mm)
Sets the left space between title text and frame (additional to boxsep).

/tcb/leftupper=(length)  (no default, initially 4mm)
Sets the left space between upper text and frame (additional to boxsep).

/tcb/leftlower=(length)  (no default, initially 4mm)
Sets the left space between lower text and frame (additional to boxsep).

/tcb/right=(length)  (style, no default, initially 4mm)
Sets the right space between all text parts and frame (additional to boxsep). This is an abbreviation for setting righttitle, rightupper, and rightlower to the same value.
Sets \( /tcbright \) \(^{p.40} \) such that \( \langle length \rangle \) is the distance between the right bounding box and the text parts.

\begin{tcolorbox}
\[ \text{This is some text.}\]
\end{tcolorbox}

\begin{tcolorbox}
\[ \text{This is \textbf{a tcolorbox}.}\]
\end{tcolorbox}

Sets the right space between title text and frame (additional to boxsep).

\begin{tcolorbox}
\[ \text{My very long title text} \]
\end{tcolorbox}

\begin{tcolorbox}
\[ \text{This is a \textbf{tcolorbox} with standard upper box dimensions.}\]
\end{tcolorbox}

Sets the right space between upper text and frame (additional to boxsep).

\begin{tcolorbox}
\[ \text{My very long title text} \]
\end{tcolorbox}

\begin{tcolorbox}
\[ \text{This is a \textbf{tcolorbox} with compressed upper box dimensions.}\]
\end{tcolorbox}
\texttt{/tcb/rightlower=(length)}

(no default, initially 4mm)

Sets the right space between lower text and frame (additional to \texttt{boxsep}).

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[width=5cm,rightlower=2cm]
This is a \texttt{\textbf{tcolorbox}} with standard upper box dimensions.
\tcblower
This is the lower part with large space at right.
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/top=(length)}

(no default, initially 2mm)

Sets the top space between text and frame (additional to \texttt{boxsep}).

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[top=0mm]
This is a \texttt{\textbf{tcolorbox}}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/toptitle=(length)}

(no default, initially 0mm)

Sets the top space between title and frame (additional to \texttt{boxsep}).

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[toptitle=3mm,title=My title]
This is a \texttt{\textbf{tcolorbox}}.
\end{tcolorbox}
\end{verbatim}
/tcb/bottom=⟨length⟩
Sets the bottom space between text and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[bottom=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
This is a tcolorbox.
This is the lower part.

/tcb/bottomtitle=⟨length⟩
Sets the bottom space between title and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[bottomtitle=3mm,title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
My title
This is a tcolorbox.

/tcb/middle=⟨length⟩
Sets the space between upper and lower text to the separation line (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[middle=0mm,boxsep=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
This is a tcolorbox.
This is the lower part.
4.7.5 Size Shortcuts

\( /tcb/size = \langle \text{name} \rangle \) (no default, initially \text{normal})

Sets all geometry keys with exception of \( /tcb/width \)\(^{\text{P.34}} \) to predefined length values. For \( \langle \text{name} \rangle \), the following values are feasible:

- \text{normal}: normal sized boxes e.g. of width \text{\linewidth}.
- \text{title}: title line sized boxes.
- \text{small}: small boxes e.g. for keyword highlighting.
- \text{fbox}: identical to the standard \text{\fbox}.
- \text{tight}: no padding space at all.
- \text{minimal}: no padding space, no box rules.

\[
\begin{tcolorbox}\[\text{size} = \langle \text{s} \rangle, \text{on line}\]{\langle \text{s} \rangle}\]
\end{tcolorbox}

\[
\begin{tcolorbox}\[\text{size} = \langle \text{s} \rangle, \text{on line}, \text{title=Test}\]{\langle \text{s} \rangle}\]
\end{tcolorbox}

<table>
<thead>
<tr>
<th>Predefined values</th>
<th>normal</th>
<th>title</th>
<th>small</th>
<th>fbox</th>
<th>tight</th>
<th>minimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>boxrule</td>
<td>0.5mm</td>
<td>0.4mm</td>
<td>0.3mm</td>
<td>0.4pt</td>
<td>0.4pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>boxsep</td>
<td>1.0mm</td>
<td>1.0mm</td>
<td>1.0mm</td>
<td>3.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>left</td>
<td>4.0mm</td>
<td>2.0mm</td>
<td>1.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>right</td>
<td>4.0mm</td>
<td>2.0mm</td>
<td>1.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>top</td>
<td>2.0mm</td>
<td>0.25mm</td>
<td>0.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>bottom</td>
<td>2.0mm</td>
<td>0.25mm</td>
<td>0.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>toptitle</td>
<td>0.0mm</td>
<td>0.0mm</td>
<td>0.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>bottomtitle</td>
<td>0.0mm</td>
<td>0.0mm</td>
<td>0.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>middle</td>
<td>2.0mm</td>
<td>0.75mm</td>
<td>0.5mm</td>
<td>1.0pt</td>
<td>0.2pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>arc</td>
<td>1.0mm</td>
<td>0.75mm</td>
<td>0.5mm</td>
<td>1.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>outer arc</td>
<td>auto</td>
<td>auto</td>
<td>auto</td>
<td>auto</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
</tbody>
</table>
Sets the text width of the upper part to the current line width plus an optional \textit{length}. This is achieved by changing the keys \texttt{/tcb/width \texttt{P.34}} \texttt{/tcb/enlarge left by \texttt{P.89}}, and \texttt{/tcb/enlarge right by \texttt{P.89}} appropriately. The resulting box is overlapping into the left and right margin of the page. Note that this style option has to be given \textit{after} all other geometry keys! Also see \texttt{/tcb/grow sidewards by \texttt{P.91}} and \texttt{/tcb/spread sidewards \texttt{P.94}}.

\begin{tcolorbox}[oversize,title=Oversized box]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[title=Normal box]
\lipsum[2]
\end{tcolorbox}

Normal text for comparison:

Oversized box

Normal box
4.7.6 Toggle Left and Right

\( \text{\texttt{tcb/toggle left and right}}(\text{toggle preset}) \) (default evenpage, initially none)

According to the \((\text{toggle preset})\), the left and the right settings of the \texttt{tcolorbox} are switched or not. Feasible values are:

- **none**: no switching.
- **forced**: the values of the left and right rules, spaces, and corners are switched.
- **evenpage**: if the page is an even page, the values of the left and right rules, spaces, and corners are switched. This value also sets /tcb/check odd page \( \rightarrow \text{P.107} \) to true.

Horizontal bounding box enlargements are not toggled by this option. They can be toggled independently by /tcb/toggle enlargement \( \rightarrow \text{P.92} \). For example, /tcb/oversize \( \rightarrow \text{P.45} \) changes the bounding box.

This example switches a 1cm thick rule from the left to the right side depending on the page number. Thereby, the rule is always on the outer side of the double-sided paper. Additionally, a ball is drawn on the outer side with help of an overlay.

\[
\text{\ttfamily \% \usepackage{lipsum} \% \usetikzlibrary{patterns} \% \tcbsublibrary{skins,breakable}} \\
\text{\ttfamily \begin{tcolorbox}\[enhanced,breakable, toggle left and right,sharp corners, boxrule=0mm,top=0mm,bottom=0mm,left=1mm,right=1mm, rightrule=1cm,colupper=blue!25!black, interior style={fill overzoom image=lichtspiel.jpg,fill image opacity=0.25}, frame style={pattern=crosshatch dots light steel blue}, overlay={\%}
\begin{tcbclipframe}
\tcbifoddpage\{\coordinate (X) at ([xshift=-5mm]frame.east);\}
{\coordinate (X) at ([xshift=5mm]frame.west);}
{\fill[shading=ball,ball color=blue!50!white,opacity=0.5] (X) circle (4mm);}
\end{tcbclipframe}}\}
\lipsum[1-6]
\end{tcolorbox}
\]

This example switches a 1cm thick rule from the left to the right side depending on the page number. Thereby, the rule is always on the outer side of the double-sided paper. Additionally, a ball is drawn on the outer side with help of an overlay.


4.8 Corners

The four corners of any \texttt{tcolorbox} can be set individually as /\texttt{tcb/sharp corners} or as /\texttt{tcb/rounded corners} \textsuperscript{P.49}. These settings are also reflected in the behavior of /\texttt{tcb/borderline} \textsuperscript{P.186} and /\texttt{tcb/shadow} \textsuperscript{P.197} as one would expect.

By default, all four corners are \textit{rounded}. So, only the /\texttt{tcb/sharp corners} option will be necessary for most use cases. The /\texttt{tcb/rounded corners} \textsuperscript{P.49} option can be used to revert a /\texttt{tcb/sharp corners} setting.

/\texttt{tcb/sharp corners}=⟨\texttt{position}⟩ (default all, initially unset)

The \texttt{⟨position⟩} denotes one or more of the four box corners to be set as \textit{sharp} corners. The not assigned corners will retain their mode. Feasible values for \texttt{⟨position⟩} are:

- \texttt{northwest}
- \texttt{northeast}
- \texttt{southwest}
- \texttt{southeast}
- \texttt{north}
- \texttt{south}
- \texttt{east}
- \texttt{west}
- \texttt{downhill}
- \texttt{uphill}
- \texttt{all}

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharp corners=northwest ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharp corners ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
The `tcb/rounded corners` can be used to revert a `tcb/sharp corners` setting. The `<position>` denotes one or more of the four box corners to be set as rounded corners. The not assigned corners will retain their mode. Feasible values for `<position>` are²:

- `northwest`
- `northeast`
- `southwest`
- `southeast`
- `north`
- `south`
- `east`
- `west`
- `downhill`
- `uphill`
- `all`

²The graphical examples assume that the boxes where set to have sharp corners before.

```latex
\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, rounded corners=northwest ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

`tcb/sharpish corners` (style, no value)

Shortcut for setting `tcb/arc` to 0pt and `tcb/outer arc` to 0pt. With this setting, rounded corners will appear as quasi-sharp, but e.g. the shadow will be somewhat rounder than the shadow of really sharp corners.

```
\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharpish corners ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```
The following examples will show the differences between \texttt{/tcb/rounded corners} \(^{P.49}\), \texttt{/tcb/sharpish corners} \(^{P.49}\), and \texttt{/tcb/sharp corners} \(^{P.48}\). The later two give the same core box, but \texttt{/tcb/borderline} \(^{P.186}\) and \texttt{/tcb/shadow} \(^{P.197}\) settings are slightly different. The following examples use \texttt{/tcb/drop fuzzy shadow} \(^{P.191}\).
4.9 Transparency

Transparency effects are likely to be used in conjunction with jigsaw skin variants, see Section 10.11 on page 210.

/tcb/opacityframe=⟨fraction⟩ (no default, initially 1.0)
Sets the frame opacity of the box to the given ⟨fraction⟩.

\begin{tcolorbox}[opacityframe=0.25, colframe=red]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/opacityback=⟨fraction⟩ (no default, initially 1.0)
Sets the background opacity of the box to the given ⟨fraction⟩.

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityframe=0.5, opacityback=0.5]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Also see /tcb/opacitybacklower→P.232 of the \ skins library.

/tcb/opacitybacktitle=⟨fraction⟩ (no default, initially 1.0)
Sets the title background opacity of the box to the given ⟨fraction⟩.

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityframe=0.5, opacitybacktitle=0.5, title filled, title=This is a title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/opacityfill=⟨fraction⟩ (style, no default, initially 1.0)
Sets the fill opacity for frame, interior and optionally the title background to the given ⟨fraction⟩.

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityfill=0.7, title=This is a title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enhanced,opacityupper=0.5,interior',style={preaction={fill=white},pattern=checkerboard,pattern'&color=gray!40}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced,opacitylower=0.5,interior',style={preaction={fill=white},pattern=checkerboard,pattern'&color=gray!40}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced,opacitytext=0.5,interior',style={preaction={fill=white},pattern=checkerboard,pattern'&color=gray!40}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced,opacitytitle=0.7,coltitle=black,fonttitle=\bfseries,title=This is a title,title']
\begin{tcolorbox}[enhanced jigsaw,fonttitle=\bfseries,title=This is a title,opacityframe=0.5,opacityback=0.25,opacitybacktitle=0.25,opacitytext=0.8, colback=red!5!white,colframe=red!75!black,colbacktitle=yellow!20!red]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

This is a \textbf{tcolorbox}.

This is a \textbf{tcolorbox}.
4.10 Height Control

In a typical usage scenario, the height of a \texttt{tcolorbox} is computed automatically to fit the content. Nevertheless, the height can be set to a fixed value or to fit commonly for several boxes, e.g. if boxes are set side by side.

The height control keys are only applicable to unbreakable boxes. If a box is set to be \texttt{/tcb/breakable} \textsuperscript{p.390}, the height is always computed according to the \textit{natural height}.

\begin{itemize}
\item \texttt{/tcb/natural height} \\
(no value, initially set)
Sets the total height of the colored box to its natural height depending on the box content.
\item \texttt{/tcb/height=\langle length \rangle} \\
(no default)
Sets the total height of the colored box to \langle length \rangle independent of the box content. \langle length \rangle is the minimum height of the box, if \texttt{/tcb/height plus} is larger than zero.
\item \texttt{/tcb/height plus=\langle length \rangle} \\
(no default, initially 0pt)
The box may extend a given fixed \texttt{/tcb/height} up to the given \langle length \rangle.
\end{itemize}
/tcb/height from\(\langle \text{min} \rangle\) to \(\langle \text{max} \rangle\) (style, no default)

Sets the box height to a dimension between \(\langle \text{min} \rangle\) and \(\langle \text{max} \rangle\).

\begin{verbatim}
% \usepackage{lipsum}
\newtcolorbox{mybox}{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm, bottom=1mm,right=1mm,boxsep=0mm,width=4.5cm,nobeforeafter, height from=2cm to 8cm}
\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}
This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.
\end{mybox}
\begin{mybox}
\lipsum[2]
\end{mybox}
\end{verbatim}

\begin{tcolorbox}\[text height=2cm\]
This is a \textbf{tcolorbox} where the text area has a height of 2cm.
\end{tcolorbox}

N 2014-10-31 /tcb/text height\(\langle \text{length} \rangle\) (style, no default)

Sets the text height to \(\langle \text{length} \rangle\). This is the length from the top of the upper part to the bottom of the optional lower part. See also /tcb/text width - P. 34.

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[text height=2cm]
This is a \textbf{tcolorbox} where the text area has a height of 2cm.
\end{tcolorbox}
\end{verbatim}

This is a tcolorbox where the text area has a height of 2cm.
/tcb/add to height=⟨length⟩ (style, no default)

Adds ⟨length⟩ to the current height of the colored box. /tcb/height→P.53 has to be set before this key is used! If this option is used several times, then the /tcb/height→P.53 is also increased several times.

\[\texttt{\tcbset{height=2cm,}
valign=center,width=(\textwidth-2mm)/2,
before=,after=\texttt{\hfill},colframe=blue!75!black,colback=white}}\]

This box has a height of 2cm.
\begin{tcolorbox}
This box has a height of 2cm.
\end{tcolorbox}
\begin{tcolorbox}[add to height=1cm]
This box has a height of 3cm.
\end{tcolorbox}
\begin{tcolorbox}
This box has a height of 3cm.
\end{tcolorbox}

/tcb/add to natural height=⟨length⟩ (style, no default)

The application of this option generates a box with natural height plus the given ⟨length⟩. If this option is used several times, then the last setting of ⟨length⟩ wins. The resulting box is not considered a fixed height box and the implementation is quite different to /tcb/add to height.

\[\texttt{\tcbset{valign=center,width=(\textwidth-2mm)/2,}
before=,after=\texttt{\hfill},colframe=blue!75!black,colback=white}}\]

\begin{tcolorbox}
This box has natural height.
\end{tcolorbox}
\begin{tcolorbox}[add to natural height=1cm]
This box has natural height plus 1 cm.
\end{tcolorbox}
\begin{tcolorbox}
This box has natural height plus 1 cm.
\end{tcolorbox}
/tcb/height fill=true|false|maximum (default true, initially false)

If set to true, the height of the \texttt{tcolorbox} is set to the rest of the available vertical space of the current page. If set to maximum, the page is compressed as much as possible. Note that the \texttt{tcolorbox} is always set as its own paragraph using this option. Also see /tcb/text fill $^\rightarrow$ P.69.

Note that the library \texttt{breakable} has to be loaded to use this key!

This height control key is only applicable to unbreakable boxes, but it uses code from the library \texttt{breakable}. The counterpart for breakable boxes is /tcb/height fixed for $^\rightarrow$ P.396.

This option can and should not be used for boxes in boxes, but it can be used for boxes inside a \texttt{tcbraster} $^\rightarrow$ P.300.

\% \usepackage{lipsum}
\% \tcbuselibrary{breakable}
\begin{tcolorbox}[height fill,  
colback=red!5!white,colframe=red!75!black,fonttitle={\bfseries},  
title=Box which fills the rest of the page]
\lipsum[1]
\end{tcolorbox}

Box which fills the rest of the page

If this option is used for a \texttt{tcolorbox} which is embedded inside another (outer) \texttt{tcolorbox} and if this outer \texttt{tcolorbox} has a fixed height, then the given \texttt{(fraction)} of the available text height of the outer \texttt{tcolorbox} is used as \texttt{/tcb/height} for the current \texttt{tcolorbox}. Otherwise, \texttt{/tcb/natural height} is applied for the current \texttt{tcolorbox}.

\begin{tcolorbox}
\begin{tcolorbox}[title=Inner box, nobeforeafter, inherit height]
This inner box matches the available space.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
\begin{tcolorbox}[title=Inner box, nobeforeafter, inherit height]
This inner box has its natural height.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
\begin{tcolorbox}[colframe=red, beforeafter skip=0pt, inherit height=0.6]
Deeply nested box using 60 percent of the available space.
\end{tcolorbox}
\begin{tcolorbox}[colframe=red, beforeafter skip=0pt, inherit height=0.4]
Deeply nested box using 40 percent of the available space.
\end{tcolorbox}
\end{tcolorbox}
Sets \texttt{/tcb/height}\textsuperscript{P.53} to match the width of the colored box.

\begin{tcolorbox}[width=3cm, colback=red!5!white, colframe=red!75!black, halign=center, valign=center, square] This is a \textbf{tcolorbox}. \end{tcolorbox}

\texttt{/tcb/space=(fraction)} \hspace{1cm} (no default, initially 0)

If the height of a \texttt{tcolorbox} is not the natural height, the space difference between the forced and the natural size is distributed between the upper and the lower part of the box. This space could also be negative. \textit{(fraction)} with a value between 0 and 1 is the amount of space which is added to the upper part, the rest is added to the lower part. If there is no lower part, then all of the space is added to the upper part always.

\texttt{\tcbset{width=(\linewidth-2mm)/3,before=,after=\hfill, colframe=blue!75!black,colback=white,height=3cm}}

\texttt{\foreach \f in {0.2,0.4,0.7}}
\texttt{\{\begin{tcolorbox}[space=\f] This is the upper part. \tcblower This is the lower part. \end{tcolorbox}\}}

\texttt{/tcb/space to upper} \hspace{1cm} (style)

This is an abbreviation for \texttt{space=1}, i.e. all extra space is added to the upper part.

\texttt{/tcb/space to lower} \hspace{1cm} (style, initially set)

This is an abbreviation for \texttt{space=0}, i.e. all extra space is added to the lower part (if there is any).
This is an abbreviation for \space=0.5, i.e. the extra space equally distributed between the upper and the lower part.

\tcbset{width=(\linewidth-2mm)/3,before=,after=\hfill, colframe=blue!75!black,colback=white,height=3cm}
\foreach \myspace in {space to upper,space to both,space to lower} {\begin{tcolorbox}\[\myspace\]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}}

This is the upper part.
This is the lower part.
This is the upper part.
This is the lower part.
This is the upper part.
This is the lower part.

\textbf{/tcb\space to=⟨macro⟩} (no default, initially unset)
If the height of a \texttt{tcolorbox} is not the natural height, the space difference between the forced and the natural size is saved into the given local ⟨macro⟩. This ⟨macro⟩ can and should be used inside the box content to add content which is vertically sized to match ⟨macro⟩.

\begin{itemize}
\item The actual length saved into ⟨macro⟩ is adapted dynamically during several compilations – at least two, but maybe more.
\item Due to the adaption algorithm, objects can be sized with ⟨macro⟩ plus any offset length.
\item Never ever use ⟨macro⟩ multiplied with a factor. The only exception to this rule is that the space can be split into parts which sum to ⟨macro⟩.
\item Never use this in combination with /tcb/fit → P.442.
\end{itemize}

\begin{tcolorbox}[colframe=blue!75!black,colback=white,height=3cm, space to=\myspace]
This is my box of height 3cm. The space is filled with a picture:
\includegraphics[width=\linewidth,height=\myspace]{goldshade.png}
This is some other text.
\end{tcolorbox}

This is my box of height 3cm. The space is filled with a picture:

This is some other text.
\begin{tcolorbox}[colframe=blue!75!black,colback=white,height=3cm, space to=\myspace]  \includegraphics[width=\linewidth, height=0.33\dimexpr\myspace\]{blueshade.png}\[1mm\]  This is my box of height 3cm.\[2mm\]  \includegraphics[width=\linewidth, height=0.67\dimexpr\myspace\]{goldshade.png}  \end{tcolorbox}

\tcbset{width=(\linewidth-2mm)/3,before=,after=\hfill,height=3cm, colback=white,colframe=blue!75!black,valign=center,valign lower=center}  \foreach \f in {0.1,0.5,0.8}  {\begin{tcolorbox}[split=\f]  This is the upper part.  \tcblower  This is the lower part with a lot of text in several lines.  \end{tcolorbox}}

/tcb/split=(fraction) (no default)
If the height of a \texttt{tcolorbox} is not the natural height, the \texttt{(fraction)} with a value between 0 and 1 determines the positioning of the segmentation between the upper and the lower part. Here, 0 stands for top and 1 for bottom. Note that the box is split regardless of the actual dimensions of the text parts!
Boxes which are members of an equal height group will all get the same height, i.e. the maximum of all their natural heights. The \langle id\rangle serves to distinguish between different height groups. Note that you have to compile twice to see changes and that height groups are global definitions.

\begin{tcolorbox}[equal height group=A, \textbf{adjusted title=One}]
My smallest box.
\end{tcolorbox}

\begin{tcolorbox}[equal height group=A, \textbf{adjusted title=Two}]
This box is also small. \tcblower
But with a lower part.
\end{tcolorbox}

\begin{tcolorbox}[equal height group=A, \textbf{adjusted title=Three}]
This box contains a lot of text just to fill the space with word flowing and flowing and flowing until the box is filled with all of it.
\end{tcolorbox}

\begin{tcolorbox}[equal height group=B]
Now, we use another equal height group.
\end{tcolorbox}

\begin{tcolorbox}[equal height group=B, \textbf{after=}]
\begin{equation*}
\int_{0}^{1} x^2 = \frac{1}{3}.
\end{equation*}
\end{tcolorbox}

\textbf{One}

My smallest box.

\textbf{Two}

This box is also small.

\tcblower
But with a lower part.

\textbf{Three}

This box contains a lot of text just to fill the space with word flowing and flowing and flowing until the box is filled with all of it.

Now, we use another equal height group.

\begin{equation*}
\int_{0}^{1} x^2 = \frac{1}{3}.
\end{equation*}

See Section 16 on page 298 for more equal height options.
Plants a \langle length \rangle into the equal height group with the given \langle id \rangle. This ensures that the height will not drop below \langle length \rangle. Note that you cannot reduce a computed height value by using this key with a small value. The difference to applying \texttt{/tcb/height}→P.53 directly is that the boxes are never too small for their content.

\begin{tcolorbox}
My first box. All boxes will get 3.5cm times 3.5cm if the content height is not too large.
\end{tcolorbox}

\begin{tcolorbox}
My second box.
\begin{tcbitemize}
\item A
\item B
\end{tcbitemize}
\end{tcolorbox}

\begin{tcolorbox}
Fourth box
My final box.
\end{tcolorbox}

Sets \texttt{/tcb/minimum for current equal height group} for the current equal height group. Apparently, this only works for an already known equal height group, i.e. \texttt{/tcb/equal height group}→P.61 has to be set before this option is used. This option is likely to be used in combination with \texttt{/tcb/raster equal height}→P.309.
/tcb/use height from group\=(id) \quad \text{(style, default current group)}

Sets the current box to a fixed /tcb/height\(^\text{P.53}\) which is copied from an equal height group with the given \(\langle id \rangle\). If this height is not available during the current compilation, no fixed height setting is used. If \(\langle id \rangle\) is omitted, the current equal height group is used which has to be set before by /tcb/equal height group\(^\text{P.61}\).

Note that the natural height of the current box is not considered for computation of the group height. The main application for /tcb/use height from group is that the height can be adapted further by /tcb/add to height\(^\text{P.55}\).

\begin{tcolorbox}[use height from group=C,add to height=-2cm, colframe=blue!75!black,colback=white]
Height from group "C" of the previous example, but reduced by 2cm.
\end{tcolorbox}

% \tcbuselibrary{raster}
Every line is inside an equal height group:
\begin{tcbraster}[raster equal height=rows, title=Box \thetcbrasternum, enhanced,size=small,colframe=red!50!black,colback=red!10!white]
\begin{tcolorbox}First line second line\end{tcolorbox}
The height of this box rules.
\begin{tcolorbox}[use height from group]Test\end{tcolorbox}
\begin{tcolorbox}[use height from group]First line second line\end{tcolorbox}
The height of this box rules.
\end{tcbraster}

\texttt{/tcbbleft\textbf{height from group}\{(macro)\}\{\langle id \rangle\}}

Saves the height from an equal height group with the given \(\langle id \rangle\) to a \(\langle macro \rangle\). If this height is not available during the current compilation, \(\langle macro \rangle\) is set to 0pt.
4.11 Box Content Additions

The following options introduce some arbitrary \textit{(code)} to the content of a \texttt{tcolorbox}. These additions can be given at the beginning or at the ending of the title, the upper part, or the lower part.

\texttt{/tcb/before title=\textit{(code)}}

The given \textit{(code)} is placed \textit{after} the color and font settings and \textit{before} the content of the title.

\tcbset{before title=\\textcolor{yellow}{\large Important:}~,
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\textbf{Important: My title}

This is a \texttt{tcolorbox}.

\texttt{/tcb/after title=\textit{(code)}}

The given \textit{(code)} is placed \textit{after} the content of the title.

\tcbset{after title=\\hfill\colorbox{Navy}{approved},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\textbf{My title} \hspace{1cm} \textcolor{Navy}{approved}

This is a \texttt{tcolorbox}. 
The given \texttt{code} is placed \textit{after} the color and font settings and \textit{before} the content of the upper part. The \texttt{code} is appended by a final \texttt{\ignorespaces}.

\begin{tcolorbox}
\textit{The story:}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My table
\begin{tabular}{cc}
\textbf{Title}\\
one & two \\
three & four\\
\end{tabular}

The given \texttt{code} is placed \textit{after} the color and font settings and \textit{before} the content of the upper part. In contrast to \texttt{/tcb/before upper}, no \texttt{\ignorespaces} is appended. Use this for situations where \texttt{\ignorespaces} is not needed or causes harm.

\begin{tcolorbox}[size=small,tile, colback=yellow!20,colbacktitle=yellow!70!black, title=My table,hbox,center,center title, before upper*=\begin{tabular}{cc}, after upper*=\end{tabular}, ]
\multicolumn{2}{c}{Title}\\
one & two \\
three & four\\
\end{tcolorbox}
The given \langle code \rangle is placed after the content of the upper part. The \langle code \rangle is prepended by a leading unskip.

\begin{tcolorbox}[title=My title]
This is a tcolorbox.
\end{tcolorbox}

«This is a tcolorbox.»

From version 3.80 to 3.94, this option prepended an \unskip to the given \langle code \rangle. From version 3.95 to 4.15, this option was deprecated. From version 4.20, this option is re-established with changed semantic (no \unskip!).
The given `<code>` is placed _after_ the color and font settings and _before_ the content of the lower part. The `<code>` is appended by a final `\ignorespaces`.

```
\tcbset{before lower=\textit{Behold:-},colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

This is a _tcolorbox_.

_Behold: This is the lower part._

\begin{tcolorbox}[size=small,bicolor,sidebyside,center lower,
  colback=yellow!30,colbacklower=yellow!20,colframe=yellow!80!black,
  before lower*=\begin{tabular}{cc},
  after lower*=\end{tabular},
]
My table
\tcblower
\multicolumn{2}{c}{Title}\n\hline
one & two \\
\hline
three & four \\
\end{tcolorbox}

My table

<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>one</td>
<td></td>
<td></td>
</tr>
<tr>
<td>two</td>
<td></td>
<td></td>
</tr>
<tr>
<td>three</td>
<td></td>
<td>four</td>
</tr>
</tbody>
</table>
The given \textit{code} is placed after the content of the lower part. The \textit{code} is prepended by a leading \texttt{\unskip}.

\begin{tcolorbox}[after lower=\textit{This is the end.},
  colback=red!5!white,colframe=red!75!black]
  This is a \textbf{tcolorbox}.
  \tcblower
  This is the lower part.
\end{tcolorbox}

This is a \texttt{tcolorbox}.

This is the lower part. \textit{This is the end.}

The given \textit{code} is placed after the content of the lower part. In contrast to \texttt{/tcb/after upper}, no \texttt{\unskip} is prepended. Use this for situations where \texttt{\unskip} is not needed or causes harm.

\begin{tcolorbox}[before lower*=\texttt{\unskip},after lower*=\texttt{\unskip},
  colback=red!5!white,colframe=red!75!black]
  This is a \texttt{tcolorbox}.
  \tcblower
  \sin^2(x)+\cos^2(x)=1.
\end{tcolorbox}

This is a \texttt{tcolorbox}.

\[ \sin^2(x) + \cos^2(x) = 1. \]

From version 3.80 to 3.94, this option prepended an \texttt{\unskip} to the given \textit{code}. From version 3.95 to 4.15, this option was deprecated. From version 4.20, this option is re-established with changed semantic (no \texttt{\unskip}!)

\begin{tcolorbox}[before lower=\texttt{\unskip},after lower=\texttt{\unskip},
  colback=red!5!white,colframe=red!75!black]
  This is a \texttt{tcolorbox}.
  \tcblower
  \sin^2(x)+\cos^2(x)=1.
\end{tcolorbox}

\[ \sin^2(x) + \cos^2(x) = 1. \]
If /tcb/text fill is used, one cannot have a lower part and the box is unbreakable.

This style sets /tcb/before upper → P.65 and /tcb/after upper → P.66 to embed the upper part with a minipage. If a fixed height was applied e.g. by /tcb/height → P.53 or /tcb/height fill → P.56, this minipage gets a matching height. This allows to use vertical glue macros like \vfill to act like expected. If the box has no fixed height, setting /tcb/text fill has no other effect as making the box unbreakable.

\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black,fonttitle=bfs, height=8cm,text fill, title=My filled box]
This is a \textbf{tcolorbox}.
\vfill
\begin{center}
My middle text.
\end{center}
\vfill
This is the end of my box.
\end{tcolorbox}

\begin{verbatim}
\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black,fonttitle=bfs, height=8cm,text fill, title=My filled box]
This is a \textbf{tcolorbox}.
\vfill
\begin{center}
My middle text.
\end{center}
\vfill
This is the end of my box.
\end{tcolorbox}
\end{verbatim}
This style sets /tcb/before upper\(^{-P.65}\) and /tcb/after upper\(^{-P.66}\) and several geometry keys to support a \texttt{tabular*} with the given \langle preamble\rangle. The packages \texttt{array} and \texttt{colortbl} have to be loaded separately.

\begin{tcolorbox}
\[\texttt{\texttt{tabulars*}={@\extracolsep{\fill}\hspace{5mm}}lrrrrr@{\hspace{5mm}}},\]
boxrule=0.5pt,title=My table\]
\begin{tabular}{lllll}
  Group & One & Two & Three & Four & Sum \\
  \hline
  Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
  Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
  Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
  \hline
  Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\end{tabular}
\end{tcolorbox}

This is a variant of \texttt{/tcb/tabulars*} which adds some \langle code\rangle before the table starts.

\begin{tcolorbox}
\begin{tabular}{llll}
  \hline
  Group & One & Two & Three \\
  \hline
  Red & 1000.00 & 2000.00 & 3000.00 \\
  Green & 2000.00 & 3000.00 & 4000.00 \\
  Blue & 3000.00 & 4000.00 & 5000.00 \\
  \hline
  Sum & 6000.00 & 9000.00 & 12000.00 \\
\end{tabular}
\end{tcolorbox}
If \texttt{tcb/tabularx} or \texttt{tcb/tabularx*} are used, one cannot have a lower part.

\texttt{/tcb/tabularx=(preamble)}

This style sets \texttt{/tcb/before upper} \cite{tabularx} and \texttt{/tcb/after upper} \cite{tabularx} and several geometry keys to support a \texttt{tabularx} with the given \texttt{(preamble)}. The packages \texttt{tabularx} \cite{tabularx}, \texttt{array}, and \texttt{colortbl} have to be loaded separately.

\begin{verbatim}
\% \usepackage{array,tabularx}
\% \usepackage{colortbl} - or - \usepackage\{table\}\{xcolor\}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X}
\tcbset{enhanced,fonttitle=\bfseries\large,fontupper=\normalsize\sffamily, colback=yellow!10!white,colframe=red!50!black,colbacktitle=Salmon!30!white, coltitle=black,center title}
\begin{tcolorbox}[tabularx={X||Y|Y|Y|Y||Y},title=My table]
  Group & One & Two & Three & Four & Sum\
  \hline
  Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00\
  Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00\
  Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00\
  \hline
  Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/tabularx*=\{\texttt{code}\}\{\texttt{preamble}\}}

This is a variant of \texttt{/tcb/tabularx} which adds some \texttt{\{\texttt{code}\}} before the table starts.

\begin{verbatim}
\% \usepackage{array,tabularx}
\% \usepackage{colortbl} - or - \usepackage\{table\}\{xcolor\}
\tcbset{enhanced,fonttitle=\bfseries\large,fontupper=\normalsize\sffamily, colback=yellow!10!white,colframe=red!50!black,colbacktitle=Salmon!30!white, coltitle=black,center title}
\begin{tcolorbox}[tabularx*=\{\texttt{arrayrulewidth}0.5mm\}{X|X|X},title=My table]
  One & Two & Three\ \\hline
  1000.00 & 2000.00 & 3000.00\ \\hline
  2000.00 & 3000.00 & 4000.00
\end{tcolorbox}
\end{verbatim}

**My table**

<table>
<thead>
<tr>
<th>Group</th>
<th>One</th>
<th>Two</th>
<th>Three</th>
<th>Four</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>1000.00</td>
<td>2000.00</td>
<td>3000.00</td>
<td>4000.00</td>
<td>10000.00</td>
</tr>
<tr>
<td>Green</td>
<td>2000.00</td>
<td>3000.00</td>
<td>4000.00</td>
<td>5000.00</td>
<td>14000.00</td>
</tr>
<tr>
<td>Blue</td>
<td>3000.00</td>
<td>4000.00</td>
<td>5000.00</td>
<td>6000.00</td>
<td>18000.00</td>
</tr>
<tr>
<td>Sum</td>
<td>6000.00</td>
<td>9000.00</td>
<td>12000.00</td>
<td>15000.00</td>
<td>42000.00</td>
</tr>
</tbody>
</table>

**My table**

<table>
<thead>
<tr>
<th>One</th>
<th>Two</th>
<th>Three</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000.00</td>
<td>2000.00</td>
<td>3000.00</td>
</tr>
<tr>
<td>2000.00</td>
<td>3000.00</td>
<td>4000.00</td>
</tr>
</tbody>
</table>
This style adds a centered `tikzpicture` environment to the start and end of the upper part. The \langle \textit{options} \rangle may be given as TikZ picture options.

\begin{tcolorbox}
\begin{tikzpicture}
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tikzpicture}
\end{tcolorbox}

This style adds a centered `tikzpicture` environment to the start and end of the lower part. The \langle \textit{options} \rangle may be given as TikZ picture options.

\begin{tcblisting}
\begin{tikzpicture}
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tikzpicture}
\end{tcblisting}
/tcb/tikznnode upper\{options\} (style)

This style places the upper part content into a centered Ti\kZ node. The \{options\} may be given as Ti\kZ node options. This style is especially useful for boxes with multiline texts which are fitted to the text width.

\% \usepackage{tikz}
\newtcbox[\headline]{enhanced,center,
  ignore nobreak,fontupper=\Large\bfseries,
  colframe=red!50!black,colback=red!10!white,
  drop fuzzy shadow=yellow,tikznnode upper,#1}
\headline{Important\Headline

Important Headline

/tcb/tikznnode lower\{options\} (style)

This style places the lower part content into a centered Ti\kZ node. The \{options\} may be given as Ti\kZ node options.

\% \usepackage{tikz}
\begin{tcolorbox}[bicolor,colback=LightBlue!50!white,colbacklower=white,
  colframe=black,tikznnode lower={inner sep=2pt,draw=red,fill=yellow}]
Upper part.
\tcblower
Lower part.
\end{tcolorbox}

Upper part.

Lower part.

/tcb/tikznnode\{options\} (style)

Shortcut for setting /tcb/tikznnode upper and /tcb/tikznnode lower the same time.

/tcb/varwidth upper\{length\} (style, default /tcb/width \textsuperscript{P.34})

This style places the upper part content into a \texttt{varwidth} environment. This style needs the \texttt{varwidth} package \textsuperscript{[1]} to be loaded manually. The resulting box has a maximal width of \{length\}. This option is only senseful for a \texttt{tcbox} \textsuperscript{P.14}.

\% \usepackage{varwidth}
\newtcbox[\varbox]{colframe=red!50!black,
  colback=red!10!white,varwidth upper}
\varbox{Short text.}
\varbox{This box contains is a longer text which is broken.}
4.12 Overlays

With an overlay, arbitrary (graphical code) can be added to a tcolorbox. This code is executed after the frame and interior are drawn and before the text content is drawn. Therefore, you can decorate the tcolorbox with your own extensions. Common special cases are watermarks which are implemented using overlays. See Subsection 10.3 from page 174 if you want to add watermarks.

If you use the core package only, the (graphical code) has to be pgf code and there is not much assistance for positioning. Therefore, the usage of the /tcb/enhanced mode from the library skins is recommended which allows tikz code and gives access to /tcb/geometry nodes for positioning.

/tcb/overlay=⟨graphical code⟩ (no default, initially unset)

Adds (graphical code) to the box drawing process. This (graphical code) is drawn after the frame and interior and before the text content.
/tcb/no overlay (style, no default, initially set)

Removes the overlay if set before.

/tcb/overlay broken=(graphical code) (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 and is broken actually, then the (graphical code) is added to the box drawing process. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay unbroken=(graphical code) (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 but is not broken actually or if the box is set to be /tcb/unbreakable → P.391, then the (graphical code) is added to the box drawing process. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay first=(graphical code) (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 and is broken actually, then the (graphical code) is added to the box drawing process for the first part of the break sequence. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay middle=(graphical code) (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 and is broken actually, then the (graphical code) is added to the box drawing process for the middle parts (if any) of the break sequence. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay last=(graphical code) (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 and is broken actually, then the (graphical code) is added to the box drawing process for the last part of the break sequence. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay unbroken and first=(graphical code) (no default, initially unset)

This is an optimized abbreviation for setting /tcb/overlay unbroken and /tcb/overlay first together. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay middle and last=(graphical code) (no default, initially unset)

This is an optimized abbreviation for setting /tcb/overlay middle and /tcb/overlay last together. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay unbroken and last=(graphical code) (no default, initially unset)

This is an optimized abbreviation for setting /tcb/overlay unbroken and /tcb/overlay last together. /tcb/overlay → P.74 overwrites this key.

/tcb/overlay first and middle=(graphical code) (no default, initially unset)

This is an optimized abbreviation for setting /tcb/overlay first and /tcb/overlay middle together. /tcb/overlay → P.74 overwrites this key.

This example demonstrates the application of break sequence specific overlay options. Here, we define an environment myexample based on tcolorbox where the visible drawing is done totally by overlay keys.

Here, the first application of myexample produces an unbroken tcolorbox. The frame is drawn by the code given with /tcb/overlay unbroken.

The second application of myexample is broken into several parts which are drawn by the codes given with /tcb/overlay first, /tcb/overlay middle, and /tcb/overlay last.

% Preamble:
%\usepackage{tikz,lipsum}
%\tcbuselibrary{skins,breakable}
%\newcounter{example}
Example 1

Example 2


Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero.


Floating box from \texttt{floatplacement}

This floating box is placed at the top of a page.

4.13 Floating Objects

\texttt{/tcb/floatplacement=⟨values⟩}

(no default, initially \texttt{htb})

Sets \texttt{⟨values⟩} as default values for the usage of \texttt{/tcb/float} and \texttt{/tcb/float*}. Feasible are the usual parameters for floating objects.

\begin{tcolorbox}
\footnotesize
\texttt{\tcbset{enhanced,colback=red!5!white,colframe=red!!75!black,}
\texttt{watermark color=red!!15!white}}
\end{tcolorbox}

\begin{tcolorbox}[floatplacement=t,float, title=\texttt{Floating box from |floatplacement|}, watermark text={\texttt{I am floating}}]
This floating box is placed at the top of a page.
\end{tcolorbox}

\texttt{/tcb/float=⟨values⟩}

(default from \texttt{floatplacement})

Turns the box to a floating object where \texttt{⟨values⟩} are the usual parameters for such floating objects. If they are not used, the placement uses the default values given by \texttt{floatplacement}.

\begin{tcolorbox}
\footnotesize
\texttt{\begin{tcolorbox}[float, title=\texttt{Floating box from |float|},
\texttt{enhanced,watermark text={\texttt{I'm also floating}}]}\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[float, title=\texttt{Floating box from |float|},
\texttt{enhanced,watermark text={\texttt{I'm also floating}}]}
This box floats to a feasible place automatically. You do not have to use a numbering for this floating object.
\end{tcolorbox}

\texttt{/tcb/float*=⟨values⟩}

(default from \texttt{floatplacement})

Identical to \texttt{/tcb/float}, but for wide boxes spanning the whole page width of two column documents or in conjunction with the packages \texttt{multicol} or \texttt{paracol}. Note that you have to set \texttt{width=\textwidth} additionally, if the box should span the whole page width in these cases!

\begin{tcolorbox}
\footnotesize
\texttt{\begin{tcolorbox}[float=b, title=\texttt{Floating box from |float*|},width=\textwidth,}
\texttt{enhanced,watermark text={\texttt{I'm also floating}}]}\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}[float=b, title=\texttt{Floating box from |float*|},width=\textwidth, enhanced,watermark text={\texttt{I'm also floating}}]
In this single column document, you will see no difference to \texttt{|float|}.
\end{tcolorbox}

\texttt{/tcb/nofloat}

(style, initially set)

Turns the floating behavior off.

Floating box from \texttt{float*}

In this single column document, you will see no difference to \texttt{float}.
For floating objects, the `/tcb/before` and `/tcb/after` settings are ignored. Instead, the given `<code>` is inserted before a floating box. If the box is `/tcb/breakable`, the given `<code>` is inserted before every part of the break sequence. The most common use case is `every float=\centering`.

```latex
\tcbox[float=htb,title={Floating box},every float=\centering, colback=blue!50!black,colframe=blue!50!white,colbacktitle=blue!10!white, coltitle=black,center title] {\includegraphics[height=6cm]{lichtspiel.jpg}}
```
4.14 Embedding into the Surroundings

Typically, but not necessarily, a \texttt{tcolorbox} is put inside a separate paragraph and has some vertical space before and after it. This behavior is controlled by the keys \texttt{/tcb/before} and \texttt{/tcb/after}.

Before version 4.40, the default setting for \texttt{/tcb/before} and \texttt{/tcb/after} was given by \texttt{/tcb/autoparskip} \footnote{P.85}. Starting with version 4.40, the default setting is given by \texttt{/tcb/before skip balanced} \footnote{P.82} and \texttt{/tcb/after skip balanced} \footnote{P.82}. Note that old documents may need adaptations of page breaks.

Alternatively, the old default setting can be restored by using \texttt{\tcbsetforeverylayer{autoparskip}} inside the document preamble.

\begin{itemize}
  \item \texttt{/tcb/before}=(\texttt{code}) \hspace{1cm} (no default, initially see \texttt{/tcb/before skip balanced} \footnote{P.82})
  \begin{itemize}
    \item Sets the \texttt{\langle code\rangle} which is executed before the colored box. It is not used for floating boxes. Also, it is not used, if the box follows a heading immediately and \texttt{/tcb/ignore nobreak} \footnote{P.87} is set to \texttt{false}.
  \end{itemize}
  \item \texttt{/tcb/after}=(\texttt{code}) \hspace{1cm} (no default, initially see \texttt{/tcb/after skip balanced} \footnote{P.82})
  \begin{itemize}
    \item Sets the \texttt{\langle code\rangle} which is executed after the colored box. It is not used for floating boxes.
  \end{itemize}
  \item \texttt{/tcb/nobeforeafter} \hspace{1cm} (style, no value)
  \begin{itemize}
    \item Abbreviation for clearing the keys \texttt{before} and \texttt{after}. The colored box is not put into a paragraph and there is no space before or after the box.
  \end{itemize}
\end{itemize}

\begin{tcolorbox}
\begin{tcplib}{myone/.style={colback=LightGreen,colframe=DarkGreen,\newline
equal height group=nobefaf,width=\linewidth/4,nobeforeafter}}
\begin{tcolorbox}[myone,title=Box 1]Box 1\end{tcolorbox} \% \\
\begin{tcolorbox}[myone,title=Box 2]Box 2\end{tcolorbox} \% \\
\begin{tcolorbox}[myone,title=Box 3]Box 3\end{tcolorbox} \% \\
\begin{tcolorbox}[myone,title=Box 4]Box 4\end{tcolorbox}
\end{tcplib}
\end{tcolorbox}

\begin{itemize}
  \item \texttt{/tcb/force nobeforeafter} \hspace{1cm} (style, no value)
  \begin{itemize}
    \item Forces the setting of \texttt{/tcb/nobeforeafter} even if \texttt{/tcb/before} and \texttt{/tcb/after} are set to other values later. Do not use this option globally unless you \textit{really} know what you do. Note that embedded boxes do not inherit this forced clearance.
  \end{itemize}
\end{itemize}
Inserts some vertical space before the colored box. This style sets \texttt{/tcb/before} \textsuperscript{\textit{P.81}}. If the depth of the preceding \TeX box is between 0pt and 0.3\baselineskip, the distance between the baseline of the preceeding \TeX box and the tcolorbox ist set to \texttt{(glue)}+0.3\baselineskip. If the depth is larger, the distance of the preceeding \TeX box and the tcolorbox ist set to \texttt{(glue)}. Alternatively, see \texttt{/tcb/before skip} \textsuperscript{\textit{P.83}} which ignores the baseline.

\begin{tcolorbox}[before skip balanced=1cm, colframe=red!50!white]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[after skip balanced=1cm, colframe=red!50!white]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[beforeafter skip balanced=0pt, height=1.8\baselineskip, enlarge top by=.1\baselineskip, enlarge bottom by=.1\baselineskip, colframe=blue!20,colback=blue!5, size=small,valign upper=center,#1 ]
\noindent\begin{tikzpicture}
\path[use as bounding box] (0,0) rectangle (0.1,0.1);
\foreach \y in {0,1,...,9} {\draw[very thin,red] (-0.2,-\y*\baselineskip) -- (\linewidth+0.2cm,-\y*\baselineskip);}
\end{tikzpicture}
\begin{doubleline} Abc \end{doubleline}
\begin{doubleline} Def \end{doubleline}
\begin{doubleline} Ghi \end{doubleline}
\end{tcolorbox}
/tcb/before skip=(glue) (style, no default)

Inserts some vertical space of the given \langle glue \rangle before the colored box. This style sets \tcb/before \rightarrow P.81. In contrast to \tcb/before skip balanced \rightarrow P.82, this \langle glue \rangle is relative to the lower edge of the preceding box and not to the baseline.

Some text.
\begin{tcolorbox}[before skip=1cm, colframe=red!50!white]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

Some text.

/tcb/after skip=(glue) (style, no default)

Inserts some vertical space of the given \langle glue \rangle after the colored box. This style sets \tcb/after \rightarrow P.81. In contrast to \tcb/after skip balanced \rightarrow P.82, this \langle glue \rangle is relative to the upper edge of the following box and not to the baseline.

\begin{tcolorbox}[after skip=1cm, colframe=red!50!white]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

Some text.

/tcb/beforeafter skip=(glue) (style, no default)

Inserts some vertical space of the given \langle glue \rangle before and after the colored box. This style sets \tcb/before skip and \tcb/after skip.

\begin{tcolorbox}
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
  Second box.
\end{tcolorbox}

\begin{tcolorbox}
  Second box.
\end{tcolorbox}

\begin{tcolorbox}
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
/tcb/left skip=(length)  
(style, no default, initially 0mm)

Inserts some horizontal space of the given \textit{length} before the colored box. This style sets \texttt{/tcb/grow} to \texttt{left} by -P.90 with the negated \textit{length}, i.e. the bounding box and box width are changed.

\begin{tcolorbox}[left skip=1cm, colframe=red!50!white]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}

/tcb/right skip=(length)  
(style, no default, initially 0mm)

Inserts some horizontal space of the given \textit{length} after the colored box. This style sets \texttt{/tcb/grow} to \texttt{right} by +P.90 with the negated \textit{length}, i.e. the bounding box and box width are changed.

\begin{tcolorbox}[right skip=1cm, colframe=red!50!white]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}

/tcb/leftright skip=(length)  
(style, no default)

Inserts some horizontal space of the given \textit{length} before \textit{and} after the colored box. This style changes the bounding box and the box width.

\begin{tcolorbox}[leftright skip=1cm, colframe=red!50!white]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}
This options is considered to be superseded by /tcb/before skip balanced \& P.82 and /tcb/after skip balanced \& P.82 (see note on page 81). Sets the keys before and after to values which are recommended, if the package \texttt{parskip} is used and there is no better idea for before and after. This is similar to:

\begin{verbatim}
\tcbset{parskip/.style={before={\par\pagebreak[0]\parindent=0pt},
                          after={\par}}}
\end{verbatim}

This options is considered to be superseded by /tcb/before skip balanced \& P.82 and /tcb/after skip balanced \& P.82 (see note on page 81). Sets the keys before and after to values which are recommended, if the package \texttt{parskip} is \textit{not} used and there is no better idea for before and after. This is similar to:

\begin{verbatim}
\tcbset{noparskip/.style={before={\par\pagebreak[0]\smallskip\parindent=0pt},
                           after={\par\smallskip}}}\end{verbatim}

This options is considered to be superseded by /tcb/before skip balanced \& P.82 and /tcb/after skip balanced \& P.82 (see note on page 81). Tries to detect the usage of the package \texttt{parskip} and sets the keys before and after accordingly. Actually, the following is done:

- If the length of \texttt{parskip} is greater than 0pt at the beginning of the document, /tcb/parskip is executed. Here, the usage of package \texttt{parskip} is assumed.
- Otherwise, if the length of \texttt{parskip} is not greater than 0pt at the beginning of the document, /tcb/noparskip is executed. Here, the absence of package \texttt{parskip} is assumed.
/tcb/baseline=(\textit{length})
(no default, initially 0pt)

Used to set the \texttt{pgfsetbaseline} value of the resulting \texttt{tcolorbox}.

\begin{Verbatim}
\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
\begin{tcolorbox}[baseline=3mm]
One line.
\end{tcolorbox}
\begin{tcolorbox}[baseline=3mm]
First line.\ Second line.
\end{tcolorbox}
\end{Verbatim}

\begin{Verbatim}
\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
\begin{tcolorbox}[box align=bottom]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=bottom]
First line.\ Second line.
\end{tcolorbox}
\end{Verbatim}

\begin{Verbatim}
\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
\begin{tcolorbox}[box align=top]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=top]
First line.\ Second line.
\end{tcolorbox}
\end{Verbatim}

\texttt{/tcb/box align=(alignment)}
(style, no default, initially \texttt{bottom})

Used to set the \texttt{/tcb/baseline} value of the resulting \texttt{tcolorbox}. Feasible values for \texttt{(alignment)} are:

- \texttt{bottom}: alignment with the box bottom,
- \texttt{top}: alignment with the box top,
- \texttt{center}: alignment with the box center,
- \texttt{base}: alignment with the box content base. This option is not applicable for a \texttt{tcolorbox} \texttt{\textemdash} P.12 but for a \texttt{\textbackslash tcolorbox} \texttt{\textemdash} P.14 only. It is an alias for \texttt{/tcb/tcbox raise base} \texttt{\textemdash} P.12.\texttt{\textemdash} P.102.
Some text
\begin{tcolorbox}
One line.
\end{tcolorbox}
First line. \Second line.
\begin{tcolorbox}
First line. Second line.
\end{tcolorbox}

Some text \dotfill
\begin{tcolorbox}
One line.
\end{tcolorbox}

\begin{align*}
    \text{One line.}\quad\text{Second line.}
\end{align*}

\texttt{\textbackslash tcbset\{colframe=red!50!white, width=4cm, nobeforeafter\}}

\texttt{\textbackslash dotfill}
\texttt{\textbackslash begin\{tcolorbox\}[box align=center]}
\texttt{One line.}
\texttt{\textbackslash end\{tcolorbox\}}
\texttt{\textbackslash begin\{tcolorbox\}[box align=center]}
\texttt{First line. }\texttt{\textbackslash Second line.}
\texttt{\textbackslash end\{tcolorbox\}}

\texttt{\textbackslash tcbset\{colframe=red!50!white, nobeforeafter\}}
\texttt{Some text\dotfill}
\texttt{\texttt{\textbackslash tcb\{nobeforeafter, box align=base\}}\{One line\}}
\texttt{\texttt{\textbackslash tcb\{nobeforeafter, box align=base, size=fbox\}}\{Another line\}}

\texttt{\textbackslash tcbset\{colframe=red!50!white, nobeforeafter\}}
\texttt{Some text\dotfill}
\texttt{\texttt{\textbackslash tcb\{nobeforeafter, box align=base\}}\{One line\}}
\texttt{\texttt{\textbackslash tcb\{nobeforeafter, box align=base, size=fbox\}}\{Another line\}}

\texttt{\texttt{\textbackslash tcb\{colframe=red!50!white, width=4cm, nobeforeafter\}}} Some text \dotfill \texttt{\texttt{\textbackslash dotfill}} \texttt{\texttt{\textbackslash begin\{tcolorbox\}[box align=center]}} One line. \texttt{\texttt{\textbackslash end\{tcolorbox\}}} \texttt{\texttt{\textbackslash begin\{tcolorbox\}[box align=center]}} First line. \texttt{\texttt{\textbackslash Second line.}} \texttt{\texttt{\textbackslash end\{tcolorbox\}}}
4.15 Bounding Box

Normally, every tcolorbox has a bounding box which fits exactly to the dimensions of the outer frame. Therefore, \LaTeX reserves exactly the space needed for the box. This behavior can be changed by enlarging (or shrinking) the bounding box. If the bounding box is enlarged, the tcolorbox will get some clearance around it. If the bounding box is shrunk, i.e. enlarged with negative values, the tcolorbox will overlap to other parts of the page. For example, the tcolorbox could be stretched into the page margin.

The following examples use /tcb/show bounding box \textsuperscript{P.188} to display the actual bounding box. For this, the library \texttt{skins} has to be included and /tcb/enhanced \textsuperscript{P.218} has to be set.

4.15.1 Shifting Bounding Box Borders

\texttt{/tcb/enlarge top initially by=\langle\text{length}\rangle} \hspace{1cm} \text{(no default, initially 0mm)}

Enlarges the bounding box distance to the top of the box by \langle\text{length}\rangle. If the box is breakable, only the first box of the break sequence gets enlarged. /tcb/enlarge top by \textsuperscript{P.89} overwrites this key.

\begin{verbatim}
\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[enlarge top initially by=-5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge top initially by=5mm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/enlarge bottom finally by=\langle\text{length}\rangle} \hspace{1cm} \text{(no default, initially 0mm)}

Enlarges the bounding box distance to the bottom of the box by \langle\text{length}\rangle. If the box is breakable, only the last box of the break sequence gets enlarged. /tcb/enlarge bottom by \textsuperscript{P.89} overwrites this key.

\begin{verbatim}
\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[enlarge bottom finally by=5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge bottom finally by=-5mm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}
/tcb/enlarge top at break by=⟨\text{length}⟩

Enlarges the bounding box distance to the top of the box by ⟨\text{length}⟩, if the box is /tcb/breakable → P.390. In this case, it is applied to middle and last parts in a break sequence. /tcb/enlarge top by overwrites this key.

/tcb/enlarge bottom at break by=⟨\text{length}⟩

Enlarges the bounding box distance to the bottom of the box by ⟨\text{length}⟩, if the box is /tcb/breakable → P.390. In this case, it is applied to first and middle parts in a break sequence. /tcb/enlarge bottom by overwrites this key.

/tcb/enlarge top by=⟨\text{length}⟩

Enlarges the bounding box distance to the top of the box by ⟨\text{length}⟩. /tcb/enlarge top initially by → P.88 and /tcb/enlarge top at break by are set to ⟨\text{length}⟩.

/tcb/enlarge bottom by=⟨\text{length}⟩

Enlarges the bounding box distance to the bottom of the box by ⟨\text{length}⟩. /tcb/enlarge bottom finally by → P.88 and /tcb/enlarge bottom at break by are set to ⟨\text{length}⟩.

/tcb/enlarge left by=⟨\text{length}⟩

Enlarges the bounding box distance to the left side of the box by ⟨\text{length}⟩.

/tcb/enlarge right by=⟨\text{length}⟩

Enlarges the bounding box distance to the right side of the box by ⟨\text{length}⟩.
/tcb/enlarge by=(length)  
(no default, initially 0mm)

Enlarges the bounding box distance to all sides of the box by \langle length\rangle.

\begin{tcolorbox} 
\textbf{tcolorbox}. 
\end{tcolorbox}

\begin{tcolorbox}[enlarge by=5mm,enhanced,show bounding box] 
\textbf{tcolorbox}. 
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox} 
\textbf{tcolorbox}. 
\end{tcolorbox}

\begin{tcolorbox}[enlarge by=5mm,enhanced,show bounding box] 
\textbf{tcolorbox}. 
\end{tcolorbox}

\begin{tcolorbox} 
\textbf{tcolorbox}. 
\end{tcolorbox}

/tcb/grow to left by=(length)  
(no default, initially 0mm)

Enlarges the current box width by \langle length\rangle and enlarges (shrinks) the bounding box distance to the left side of the box by −\langle length\rangle. Also see /tcb/left skip → P.84.

\begin{tcolorbox}[width=5cm,grow to left by=2cm,enhanced,show bounding box] 
\textbf{tcolorbox} with a width of 7cm. 
\end{tcolorbox}

This is a \textbf{tcolorbox} with a width of 7cm.

\begin{tcolorbox}[width=5cm,grow to left by=2cm,enhanced,show bounding box] 
\textbf{tcolorbox}. 
\end{tcolorbox}

\begin{tcolorbox}[grow to left by=1cm,grow to right by=2cm,enhanced,show bounding box] 
\textbf{tcolorbox}. 
\end{tcolorbox}

This is a \textbf{tcolorbox}. 

\begin{tcolorbox}[enhanced,show bounding box] 
\textbf{tcolorbox}. 
\end{tcolorbox}

\begin{tcolorbox}[enhanced,show bounding box] 
\textbf{tcolorbox}. 
\end{tcolorbox}

\begin{tcolorbox}[enhanced,show bounding box] 
\textbf{tcolorbox}. 
\end{tcolorbox}

/tcb/grow to right by=(length)  
(no default, initially 0mm)

Enlarges the current box width by \langle length\rangle and enlarges (shrinks) the bounding box distance to the right side of the box by −\langle length\rangle. Also see /tcb/right skip → P.84.

\begin{tcolorbox}[grow to right by=2cm,enhanced,show bounding box] 
\textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[grow to right by=2cm,grow to left by=1cm,enhanced,show bounding box] 
\textbf{tcolorbox}. 
\end{tcolorbox}

\begin{tcolorbox}[enhanced,show bounding box] 
\textbf{tcolorbox}. 
\end{tcolorbox}

\begin{tcolorbox}[enhanced,show bounding box] 
\textbf{tcolorbox}. 
\end{tcolorbox}

\begin{tcolorbox}[enhanced,show bounding box] 
\textbf{tcolorbox}. 
\end{tcolorbox}
4.15.2 Box Alignment

/tcb/flush left  (style, no value)

Enlarges the bounding box to the right side to fill the line completely.

/tcb/flush right (style, no value)

Enlarges the bounding box to the left side to fill the line completely.

/tcb/center  (style, no value)

Enlarges the bounding box equally to both sides to fill the line completely.
4.15.3 Toggle Enlargements

\texttt{\texttt{/tcb/toggle enlargement=\{toggle preset\}} (default evenpage, initially none)}

According to the \texttt{\{toggle preset\}}, the left and right enlargements of the bounding box are switched or not. Feasible values are:

- \texttt{none}: no switching.
- \texttt{forced}: the values of the left and right enlargement are switched.
- \texttt{evenpage}: if the page is an even page, the values of the left and right enlargement are switched. This value also sets /tcb/check odd page \textsuperscript{P.107} to true.

\textbf{See /tcb/toggle left and right \textsuperscript{P.46} to toggle geometry settings.}

\begin{tcolorbox}[toggle enlargement=none,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[toggle enlargement=forced]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[toggle enlargement=evenpage]
This page is an \texttt{tcbifoddpage\{odd\}\{even\} page. Therefore, the left and right enlargements \texttt{tcbifoddpage\{are not\}\{are\} toggled.}
\end{tcolorbox}

\textbf{This page is an even page. Therefore, the left and right enlargements are toggled.}

\begin{tcolorbox}[colframe=red!60!black,colback=red!15!white,fonttitle=\textbfseries,title=\texttt{Floating box from \texttt{toggle enlargement}},width=\textwidth,grow to right by=2cm,toggle enlargement,float=t]
This page is an \texttt{tcbifoddpage\{odd\}\{even\} page. Therefore, the left and right enlargements \texttt{tcbifoddpage\{are not\}\{are\} toggled. This box stretches to the right margin on odd pages and to the left margin on even pages. The current document is one-sided -- this feature makes sense for two-sided documents only.}
\end{tcolorbox}
4.15.4 Spread Box to Page Borders

The following border options are not applicable to nested boxes, boxes inside tables, etc. For boxes inside lists, the options may work, but not necessarily. Also, boxes should be set with \noindent and full width.

\[ /tcb/spread\textit{ inwards}=(\textit{length}) \]

(default 0pt, initially unset)

Enlarges the current box width to match the inner page border (left-handed side for one-sided documents). If the optional \textit{(length)} is greater than 0pt, the box grows over the border, if \textit{(length)} is lower than 0pt, there is a margin between box and page border. \textit{/tcb/toggle enlargement} \( ^{\text{P.92}} \) is set automatically.

\begin{tcolorbox}[enhanced,spread inwards, colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\[ /tcb/spread\textit{ outwards}=(\textit{length}) \]

(default 0pt, initially unset)

Enlarges the current box width to match the outer page border (right-handed side for one-sided documents). If the optional \textit{(length)} is greater than 0pt, the box grows over the border, if \textit{(length)} is lower than 0pt, there is a margin between box and page border. \textit{/tcb/toggle enlargement} \( ^{\text{P.92}} \) is set automatically.

\begin{tcolorbox}[enhanced,spread outwards, colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\[ /tcb/move\textit{ upwards}=(\textit{length}) \]

(default 0pt, initially unset)

Starts a new page with the box at the very top page border. If the optional \textit{(length)} is greater than 0pt, the box moves over the border, if \textit{(length)} is lower than 0pt, there is a margin between box and page border.

\[ /tcb/move\textit{ upwards*}=(\textit{length}) \]

(default 0pt, initially unset)

Identical to \textit{/tcb/move upwards}, but without starting a new page.

\[ /tcb/fill\textit{ downwards}=(\textit{length}) \]

(default 0pt, initially unset)

Enlarges the height of the box until the very bottom page border. The library \textit{breakable} has to be loaded, and \textit{/tcb/height fill} \( ^{\text{P.56}} \) is set automatically. If the optional \textit{(length)} is greater than 0pt, the box moves over the border, if \textit{(length)} is lower than 0pt, there is a margin between box and page border.

\begin{tcolorbox}[enhanced,fill downwards, colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is an example for “spread upwards”.

\begin{tcolorbox}[enhanced,spread upwards,sharp corners=north,height=3cm, colframe=blue!75!black,interior style={top color=blue!50,bottom color=white}]
This is an example for \enquote{spread upwards}.
\end{tcolorbox}

Identical to \texttt{/tcb/move upwards} \(^{\text{P.93}}\), but without starting a new page.

\begin{tcolorbox}[enhanced,spread sidewards, colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,spread downwards,sharp corners=south, colframe=red!75!black,interior style={top color=white,bottom color=red!50}]
This is an example for \enquote{spread downwards}.
\end{tcolorbox}

This is an example for “spread downwards”.

\begin{tcolorbox}[enhanced,spread downwards,sharp corners=south, colframe=red!75!black,interior style={top color=white,bottom color=red!50}]
This is an example for \enquote{spread downwards}.
\end{tcolorbox}
4.15.5 Box Extrusion

The following keys should not be used with breakable boxes or boxes with a lower part.

/tcb/shrink tight (style, no value, initially unset)

The total colored box is shrunk to the dimensions of the upper part. There should be no lower part and no title. This style sets the /tcb/boxsep to 0pt and other geometry keys to fitting values. This option is likely to be used with the following extrusion keys.

\tcbset{colframe=blue!75!black,colback=white,arc=0mm,boxrule=0.4pt, nobeforeafter,tcbox raise base,shrink tight}

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Lorem \tcbox\{ipsum\} dolor sit amet, consectetuer adipiscing elit.

This is a tcolorbox.

Lorem ipsum dolor sit amet, consectetuer adipiscing elit.

\begin{tcolorbox}[extrude left by=1cm]
Curabitur dictum gravida mauris.
Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.
\end{tcolorbox}

/tcb/extrude left by=(length) (style, no default, initially unset)

The (upper part of the) colored box is extruded by the given (length) to the left side. The inner width and the bounding box is kept unchanged and the operation is additive!

\tcbset{enhanced,colframe=red,colback=yellow!25!white, frame style={opacity=0.25},interior style={opacity=0.5}, nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis.
\tcbox[extrude left by=1cm]{Curabitur} dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

\begin{tcolorbox}[extrude left by=1cm]
Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.
\end{tcolorbox}

/tcb/extrude right by=(length) (style, no default, initially unset)

The (upper part of the) colored box is extruded by the given (length) to the right side. The inner width and the bounding box is kept unchanged and the operation is additive!

\tcbset{enhanced,colframe=red,colback=yellow!25!white, frame style={opacity=0.25},interior style={opacity=0.5}, nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis.
\tcbox[extrude right by=1cm]{Curabitur} dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

\begin{tcolorbox}[extrude right by=1cm]
Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.
\end{tcolorbox}
The (upper part of the) colored box is extruded by the given \texttt{(length)} to the top side. The inner width and the bounding box is kept unchanged and the operation is additive!

\texttt{\tcset{enhanced,colframe=red,colback=yellow!25!white, frame style={opacity=0.25},interior style={opacity=0.55}, nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}}

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \texttt{\tcbox[extrude top by=1cm]{Curabitur} dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna.}

The (upper part of the) colored box is extruded by the given \texttt{(length)} to the bottom side. The inner width and the bounding box is kept unchanged and the operation is additive!

\texttt{\tcset{enhanced,colframe=red,colback=yellow!25!white, frame style={opacity=0.25},interior style={opacity=0.55}, nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}}

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \texttt{\tcbox[extrude bottom by=1cm]{Curabitur} dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna.}

The (upper part of the) colored box is extruded by the given \texttt{extrude by=(length)} to all sides. The inner width and the bounding box is kept unchanged and the operation is additive!

\texttt{\tcset{enhanced,colframe=red,colback=yellow!25!white, frame style={opacity=0.25},interior style={opacity=0.55}, nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}}

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \texttt{\tcbox{Curabitur} dictum gravida mauris. \tcbox[colframe=Green,interior style={opacity=0.0}]{Nam} arcu libero, nonummy eget, consectetur id, \tcbox[vulputate] a, magna.Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. \tcbox[Mauris ut leo.]}

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \texttt{Curabitur} dictum gravida mauris. \texttt{Nam} arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. \texttt{Mauris ut leo.}
4.16 Layered Boxes and Every Box Settings

A \tcolorbox may contain another \tcolorbox and so on. The package takes track of the nesting level using a counter \tcblayer. Counter values may be used for doing some fancy things, but you should never change the counter value yourself.

The package takes special care for the first four layers or nesting levels, called managed layers. Here, footnote texts are administrated to find their intended place and specific layer dependent options may be set by changing \texttt{/tcb/every box on layer n} after \texttt{P.98}. If needed, the number of managed layers can be increased by setting \texttt{\tcbsetmanagedlayers} after \texttt{P.98} to a higher value than 4.

The following styles have a considerable influence on how layered boxes are processed. Note especially that nested boxes are getting a \texttt{/tcb/reset} after \texttt{P.112} by default. You can change this, but be prepared for surprises if you do.

If the defaults are \textit{not changed}, a \tcolorbox gets its options in the following order. Following options overwrite preceding options.

1. On package load, all options are set to default values.
2. Every \texttt{\tcbset} after \texttt{P.13} command adds or changes options for the following boxes inside the current \TeX{} group.
3. While entering a \tcolorbox, a \texttt{/tcb/every box on layer n} after \texttt{P.98} or \texttt{/tcb/every box on higher layers} after \texttt{P.98} option list is applied. With default settings this means:
   - For layer 1 (lowest layer), the \texttt{/tcb/every box} option list is applied. Not overwritten options given by a preceding \texttt{\tcbset} after \texttt{P.13} survive.
   - For layer 2 and above (nested boxes), a \texttt{/tcb/reset} after \texttt{P.112} followed by \texttt{/tcb/every box} option list is applied. Every resettable options given by a preceding \texttt{\tcbset} after \texttt{P.13} and by the surrounding box(es) are reset.
4. The \textit{⟨options⟩} given to the \tcolorbox are applied. Or, if the box was generated by \texttt{\newtcolorbox} after \texttt{P.15} or friends, the \textit{⟨options⟩} given there are applied.
5. If the box was generated by \texttt{\newtcolorbox} after \texttt{P.15} or friends, some automated options are applied.

\texttt{/tcb/every box} \hspace{1cm} (style)

By default, this style is empty.

\begin{quote}
% default setting: \\
\texttt{\tcbset{every box/.style={}}} \\
\end{quote}

It may be changed by redefining this style.

\begin{quote}
% setting all boxes to be enhanced: \\
\texttt{\tcbset{every box/.style={enhanced}}} \\
\end{quote}

The alternative for setting something for every box (on every layer) is \texttt{\tcbsetforeverylayer} after \texttt{P.13}:

\begin{quote}
% setting all boxes to be enhanced: \\
\texttt{\tcbsetforeverylayer{enhanced}} \\
\end{quote}
Here, \( n \) has to be replaced by a number ranging from 1 to the highest managed layer number (4 by default).

% default settings:
\tcbset{
    every box on layer 1/.style={every box},
    every box on layer 2/.style={reset,every box},
    every box on layer 3/.style={reset,every box},
    every box on layer 4/.style={reset,every box},
}

\tcbset{every box on higher layers/.style={reset,every box}}

\tcbsetmanagedlayers{⟨number⟩}
Replaces the highest managed layer number by ⟨number⟩ where 4 is the default. This macro can only be used inside the preamble. Using a ⟨number⟩ lower than 4 typically makes no sense, but is not forbidden.

% \usepackage{lipsum}
% \tcbuselibrary{skins,breakable}
\tcbset{colframe=red!75!black,fonttitle=\bfseries,
colback=red!5!white,
every box/.style={enhanced,watermark text=\thetcblayer,
    before=\par\smallskip,after=\par\smallskip},
every box on layer 2/.style={reset,every box,colback=yellow!10!white,
    drop fuzzy shadow}}
\begin{tcolorbox}[enhanced jigsaw,breakable,title=Layer 1 Box]
Here comes a footnote\footnote{Footnote from layer 1 box}.
\end{tcolorbox}
\begin{tcolorbox}[title=Layer 2 Box]
abc\footnote{The footnote of abc}
\end{tcolorbox}
\begin{tcolorbox}[title=Another Box,ams equation]
\begin{tcbhighmath}
\sum\limits_{n=1}^{\infty} \frac{1}{n} \rightarrow \infty.
\end{tcbhighmath}
\end{tcolorbox}
Some text\footnote{Footnote from some text}.
\begin{tcolorbox}[title=Yet Another Box]
\tcboxfit[height=2cm]{\lipsum[1]}{\lipsum[2]} My text.
\end{tcolorbox}
Another lipsum text\footnote{A lipsum text}. \lipsum[3]
\begin{tcolorbox}[title=Layer 4, colframe=blue, colback=white]
Layer 4\footnote{Layer 4 footnote}
\end{tcolorbox}
The End\footnote{Last footnote}.
\end{tcolorbox}

Layer 2 Box

abc

The footnote of abc

Another Box

\[ \sum_{n=1}^{\infty} \frac{1}{n} = \infty. \] (1)

Some text.

Yet Another Box


My text.


Layer 4

Layer 4

Layer 4 footnote

The End.

Footnote from layer 1 box

Footnote from some text

Footnote from layer 4 box

Footnote from some text
4.17 Capture Mode

\(/tcb/capture=\langle mode\rangle\) (no default, initially minipage)

The capture \(\langle mode\rangle\) defines how the box content is processed. Feasible values for \(\langle mode\rangle\) are:

- **minipage:**
  This is the default \(\langle mode\rangle\) for \texttt{tcolorbox}\textsuperscript{\textcopyright P.12}. The content may have an upper and a lower part. Optionally, the box can be \(/tcb/breakable\)\textsuperscript{\textcopyright P.390}. The box content is put into a minipage or into something similar to a minipage.

- **hbox:**
  This is the default \(\langle mode\rangle\) for \texttt{tcbox}\textsuperscript{\textcopyright P.14}. The content cannot have a lower part and cannot be broken. The colored box is sized according to the dimensions of the content. A shortcut to set this mode is \(/tcb/hbox\).

- **fitbox:** (needs the \texttt{fitting} library)
  This is the default \(\langle mode\rangle\) for \texttt{tcboxfit}\textsuperscript{\textcopyright P.439}. The content cannot have a lower part and cannot be broken. The content is sized according to the dimensions of the colored box. A shortcut to set this mode is \(/tcb/fit\)\textsuperscript{\textcopyright P.442}.

\begin{tcolorbox}
\[\text{\texttt{tcbset}}\{\text{colframe=blue!75!black, colback=white}\}\]
\begin{tcolorbox}[\texttt{capture=minipage}]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[\texttt{capture=hbox}]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[\texttt{capture=fitbox}, \texttt{height=9mm}]% needs the \texttt{fitting} library
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[\texttt{hbox}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[\texttt{minipage}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[\texttt{breakable}]
This is a tcolorbox.
\end{tcolorbox}

\(/tcb/hbox\) (style, no default)
Shortcut for \texttt{capture=hbox}.

\begin{tcolorbox}[\texttt{hbox}]
This is a tcolorbox.
\end{tcolorbox}

\(/tcb/minipage\) (style, no default)
Shortcut for \texttt{capture=minipage}.
The text inside a \texttt{tcolorbox} is formatted using a LATEX \texttt{minipage} if the box is unbreakable. If breakable, the box tries a mimicry of a \texttt{minipage}. In a \texttt{minipage} or \texttt{parbox}, paragraphs are formatted slightly different as the main text. If the key value is set to \texttt{false}, the normal main text behavior is restored. In some situations, this has some unwanted side effects. It is recommended that you use this experimental setting only where you really want to have this feature.

\begin{verbatim}
\usepackage{lipsum} % preamble
\setlength{\parindent}{0pt}
\begin{tcolorbox}[parbox,adjusted title={parbox=true (normal)}]
\lipsum[1-2]
\end{tcolorbox}
\begin{tcolorbox}[parbox=false,adjusted title={parbox=false}]
\lipsum[1-2]
\end{tcolorbox}
\end{verbatim}

\begin{tcolorbox}
\begin{verbatim}
\begin{tcolorbox}[parbox,adjusted title={parbox=true (normal)}]
\lipsum[1-2]
\end{tcolorbox}
\begin{tcolorbox}[parbox=false,adjusted title={parbox=false}]
\lipsum[1-2]
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

\begin{tcolorbox}
\begin{verbatim}
\usepackage{lipsum} % preamble
\setlength{\parindent}{0pt}
\begin{tcolorbox}[parbox,adjusted title={parbox=true (normal)}]
\lipsum[1-2]
\end{tcolorbox}
\begin{tcolorbox}[parbox=false,adjusted title={parbox=false}]
\lipsum[1-2]
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

parbox=true (normal)


parbox=false


/tcb/hyphenationfix=true|false  (default true, initially false)

Long words at the beginning of paragraphs in very narrow boxes will not be hyphenated using \texttt{pdflatex}. This problem is circumvented by applying the \texttt{hyphenationfix} option.

\begin{tcolorbox}[colframe=blue!75!black,\texttt{fontupper}=\texttt{\normalsize},\texttt{colback}=blue!5!white,\texttt{width}=4cm]
Rechnungsadjunktentochter.\par
Statthalterekonzipist.
\end{tcolorbox}

\begin{tcolorbox}[\texttt{hyphenationfix}]
Rechnungsadjunktentochter.\par
Statthalterekonzipist.
\end{tcolorbox}

\textbf{parbox=false} and \texttt{hyphenationfix} should not be used together. They are targeting different box types and they do not blend very well.

4.19 Files

/tcb/tempfile=\texttt{file name}  (no default, initially \texttt{\jobname.tcbtemp})

Sets \texttt{file name} as name for the temporary file which is used inside \texttt{tcbwritetemp} \textsuperscript{P.133} and \texttt{tcbusetemp} \textsuperscript{P.133} implicitly.

4.20 \texttt{tcbbox} Specials

The following options are applicable for \texttt{tcbbox} \textsuperscript{P.14} and \texttt{tcbboxmath} \textsuperscript{P.364} only.

/tcb/tcbox raise=\texttt{length}  (no default, initially 0pt)

Placing the \texttt{tcbbox} \textsuperscript{P.14} by the given \texttt{length}.

\begin{tcbset}{colframe=blue!50!black,colback=white,colupper=red!50!black,\texttt{fonttitle}=\texttt{\bfseries},\texttt{nobeforeafter},\texttt{center title}}
Test\texttt{\dotfill tcbbox\{tcbbox raise base\}{Hello World 1}\texttt{\dotfill tcbbox\{Hello World 2\}\texttt{\dotfill tcbbox\{tcbbox raise=5mm\}{Hello World 3}}

Test . . . . . . Hello World 1 . . . . . . Hello World 2 . . . . . . Hello World 3

/tcb/tcbox raise base  (style, no value, initially unset)

Placing the \texttt{tcbbox} \textsuperscript{P.14} such that the base of its content matches the base of the environmental line; see example above.

/tcb/on line  (style, no value, initially unset)

Combines /tcb/tcbox raise base with \texttt{tcb/nobeforeafter} \textsuperscript{P.81}. The resulting box behaves analogue to \texttt{fbox}.
\tcbset{size=small,on line,before upper=\strut, colframe=blue!75!black,colback=blue!5!white, fontupper=\normalsize,width=4cm}

\tcbox[tcbox width=auto]{auto} \quad \tcbox[tcbox width=auto limited]{auto limited} \quad \tcbox[tcbox width=auto limited]{auto limited with long text} \quad \tcbox[tcbox width=forced center]{forced center} \quad \tcbox[tcbox width=forced center]{forced center with long text} \quad \tcbox[tcbox width=forced left]{forced left} \quad \tcbox[tcbox width=forced left]{forced left with long text} \quad \tcbox[tcbox width=forced right]{forced right} \quad \tcbox[tcbox width=forced right]{forced right with long text} \quad \tcbox[tcbox width=minimum center]{minimum center} \quad \tcbox[tcbox width=minimum center]{minimum center with long text} \quad \tcbox[tcbox width=minimum left]{minimum left} \quad \tcbox[tcbox width=minimum left]{minimum left with long text} \quad \tcbox[tcbox width=minimum right]{minimum right} \quad \tcbox[tcbox width=minimum right]{minimum right with long text}

\hspace{1.5cm}

\begin{tikzpicture}
\begin{scope}[every node/.style={draw,rounded corners,minimum width=2cm,minimum height=2cm}]
\node (auto) at (1,2) {auto};
\node (auto limited) at (3,2) {auto limited};
\node (auto limited with long text) at (5,2) {auto limited with long text};
\node (forced center) at (1,1) {forced center};
\node (forced center with long text) at (3,1) {forced center with long text};
\node (forced left) at (1,0) {forced left};
\node (forced left with long text) at (3,0) {forced left with long text};
\node (forced right) at (1,-1) {forced right};
\node (forced right with long text) at (3,-1) {forced right with long text};
\node (minimum center) at (1,-2) {minimum center};
\node (minimum center with long text) at (3,-2) {minimum center with long text};
\node (minimum left) at (1,-3) {minimum left};
\node (minimum left with long text) at (3,-3) {minimum left with long text};
\node (minimum right) at (1,-4) {minimum right};
\node (minimum right with long text) at (3,-4) {minimum right with long text};
\end{scope}
\end{tikzpicture}
4.21 Counters, Labels, and References

\texttt{/tcb/phantom=⟨code⟩} \hspace{1em} \text{(no default, initially unset)}

The \langle code\rangle is put in a box at the upper left corner of the tcolorbox. If the tcolorbox
is breakable, the \langle code\rangle is executed for the first box of the break sequence only. If there
already was some phantom code given, the new \langle code\rangle is appended.

The \langle code\rangle is intended to be used for counter stepping, labelling, and related operations
which do not produce visible text.

- The \langle code\rangle is executed before the title and box content, i.e. counter values are ensured
to be increased before usage.
- Labels are ensured to reference the correct page number.
- The \langle code\rangle is executed only once even during fitting operations for title and box con-
tent.
- In combination with the hyperref package, the hyper anchor is set to the upper left
corner of the tcolorbox, i.e. links inside the pdf document will jump to the box
pleasantly.
- Since the \langle code\rangle is executed inside a \TeX\ group, only global operations can survive
this group.

Examples for the \texttt{phantom} usage are given in Section 17.9 from page 356, e.g. Example 17.1
on page 357.

\texttt{/tcb/nophantom} \hspace{1em} \text{(no value, initially set)}

Removes the phantom code if set before.

\texttt{/tcb/label=⟨marker⟩} \hspace{1em} \text{(no default, initially unset)}

The \langle marker\rangle is set as label text for a reference with the \texttt{\ref} macro. Typically, this
option is used for numbered boxes, see Subsection 5.1 from page 114, e.g. \texttt{/tcb/new/auto
counter P.114}.

\texttt{/tcb/phantomlabel=⟨marker⟩} \hspace{1em} \text{(no default, initially unset)}

Equivalent to \texttt{/tcb/label} for an unnumbered box. A \texttt{\phantomsection} from the package
hyperref [15] is used to set a correct hyperlink target. This is not needed for a numbered
box.

\texttt{/tcb/label type=⟨type⟩} \hspace{1em} \text{(no default, initially unset)}

This option key can be used only in conjunction with the cleveref package [5] which has
to be loaded separately. \langle type\rangle has to be a cross-reference type known to cleveref like
theorem, algorithm, result, etc. References made with cleveref will use this type. Note
that using label type will result in compilation errors, if cleveref is not loaded. For an
example, see Theorem 18.3.5 on page 384.

\texttt{/tcb/no label type} \hspace{1em} \text{(no value, initially set)}

Removes a \texttt{/tcb/label type}, if set before.

\texttt{/tcb/step=⟨counter⟩} \hspace{1em} \text{(no default, initially unset)}

Shortcut for \texttt{phantom={\refstepcounter{#1}}}. The given \langle counter\rangle is increased and ready
for labelling. This option is not needed when using the convenient automated numbering
introduced with version 2.40, see Subsection 5.1 from page 114.

\texttt{/tcb/step and label=⟨counter⟩{⟨marker⟩}} \hspace{1em} \text{(no default, initially unset)}

Shortcut for using \texttt{/tcb/step} and \texttt{/tcb/label}. This option is not needed when using the
convenient automated numbering introduced with version 2.40, see Subsection 5.1 from
page 114.
\textbf{/tcb/list\ entry}={(text)} \hspace{1cm} \text{(no default, initially unset)}

If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 121 is used, this key describes the \langle text\rangle for an entry into the generated list, e.g.

\begin{tcolorbox}
\protect\numberline{\thetcbcounter}My beautiful Example
\end{tcolorbox}

See Section 17.9 from page 356 for a complete example.

\textbf{/tcb/list\ text}={(text)} \hspace{1cm} \text{(style, no default)}

This is a shortcut for setting \texttt{/tcb/list\ entry} to \protect\numberline{\thetcbcounter}{\langle text\rangle}. So, the following settings are identical:

\begin{tcolorbox}
list text=My beautiful Example,
list entry=\protect\numberline{\thetcbcounter}My beautiful Example
\end{tcolorbox}

See Section 17.9 from page 356 for a complete example.

\textbf{/tcb/add to list}={\langle list\rangle}{\langle type\rangle} \hspace{1cm} \text{(no default, initially unset)}

If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 121 is used, list entries are generated automatically. With this key, you can enforce an entry to the given \langle list\rangle with the given \langle type\rangle. This issues:

\begin{verbatim}
\addcontentsline{\langle list\rangle}{\langle type\rangle}{\langle entry text\rangle}
\end{verbatim}

\textbf{/tcb/nameref}={(text)} \hspace{1cm} \text{(no default, initially unset)}

If the \texttt{nameref} package is loaded, the given \langle text\rangle is used for corresponding \texttt{\nameref} macros. Typically, the \langle text\rangle will be chosen to be identical or nearly identical to the one for \texttt{/tcb/title} \texttt{P.18}.

\begin{verbatim}
\newtcolorbox[auto counter,number within=section]{pabox}[2][]{%
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=Examp.-\thetcbcounter: #2,#1}
\begin{pabox}[label={mynamelabel},nameref={Title or anything else}]{Title text}
This is a tcolorbox.
\end{pabox}
This box is automatically numbered with \ref{mynamelabel} on page \pageref{mynamelabel}.
The box is titled \enquote{\nameref{mynamelabel}}.
\end{verbatim}

\textbf{Examp. 4.1: Title text}

This is a tcolorbox.

\begin{verbatim}
\begin{pabox}[name reference={mynamelabel}]{Title text}
This is a tcolorbox.
\end{pabox}
\end{verbatim}

This box is automatically numbered with 4.1 on page 105. The box is titled “Title or anything else”.

\textbf{/tcb/nameref} is used automatically inside \texttt{\newtcbtheorem} \texttt{P.362}.
A \texttt{hypertarget} from the package \texttt{hyperref} \cite{hyperref} is used to create an internal link of an anchor \langle \texttt{marker} \rangle. This \langle \texttt{marker} \rangle can be referenced by \texttt{\hyperlink} or \texttt{/tcb/hyperlink} \footnote{P.208}.

\begin{tcolorbox}
\[enhanced, 
colback=red!10, colframe=red!50!black, 
hypertarget=hypertwinA, 
\hyperlink=hypertwinB, 
title=Box A\]
Click me to jump to Box B.
\end{tcolorbox}

Sets a PDF bookmark with the given \langle \texttt{text} \rangle, if the package \texttt{bookmark} \cite{bookmark} is loaded. This bookmark is set with an automated destination (the current box) and is set one level below the current bookmark level.

\begin{tcolorbox}
\[colback=blue!10, colframe=blue!50!black, 
\bookmark=Example for using a bookmark, 
title=Example for using a bookmark\]
Open the bookmark view of the previewer to see the bookmark.
\end{tcolorbox}

Identical to /tcb/bookmark, but additional \langle \texttt{options} \rangle from the package \texttt{bookmark} \cite{bookmark} can be given.

\begin{tcolorbox}
\[colback=red!10, colframe=red!50!black, 
\bookmark*=color=red,italic,bold\] 
\{Another bookmark example\}, 
title=Red and bold bookmark\]
Open the bookmark view of the previewer to see the bookmark.
\end{tcolorbox}

Adds an index \langle \texttt{entry} \rangle for the box. This is a shortcut for setting \texttt{\index{\langle \texttt{entry} \rangle}} to \texttt{/tcb/phantom} \footnote{P.104}.

\begin{tcolorbox}
\[name\{\langle \texttt{entry} \rangle\}\]
Adds an \langle \texttt{entry} \rangle to an index with a specific \langle \texttt{name} \rangle. This is a shortcut for setting \texttt{\index[\langle \texttt{name} \rangle]{\langle \texttt{entry} \rangle}} to \texttt{/tcb/phantom} \footnote{P.104}. An index extension package like \texttt{imakeidx} has to be loaded to use this option key.
4.22 Even and Odd Pages

Also see /tcb/toggle left and right → P.46 and /tcb/toggle enlargement → P.92 for further even/odd options.

/tcb/check odd page=\{true|false\} (default true, initially false)

If set to true, a precise even/odd page testing for the current box is applied. This is done by using labels. If a box moves to another page, the document has to be compiled twice for the correct settings. If set to false, even/odd page tests may give wrong results for the first box of a page.

/tcb/toggle left and right → P.46, /tcb/toggle enlargement → P.92, and /tcb/if odd page automatically set check odd page, but for \tcblifoddpage → P.109 this option has to be set explicitly.

/tcb/if odd page=\{\langle odd options\rangle\}\{\langle even options\rangle\} (style, no default)

If the current box is on an odd page, the \langle odd options\rangle are applied. On an even page, the \langle even options\rangle are applied. /tcb/check odd page is automatically set for precise even/odd page testing.

\begin{tcolorbox}[if odd page={colback=yellow!50}{colback=red!50}]
This box is colored in yellow on an odd page
and is colored in red on an even page.
\end{tcolorbox}

This box is colored in yellow on an odd page and is colored in red on an even page.

If a box is /tcb/breakable → P.390, using /tcb/if odd page only acts upon the first box. If the setting should be repeated for every partial box of the break sequence, the option should be packed into /tcb/extras → P.397. In this case, /tcb/check odd page has to be set explicitly! Also see /tcb/if odd page* → P.108.

/tcb/if odd page or oneside=\{\langle odd options\rangle\}\{\langle even options\rangle\} (style, no default)

For onesided documents, the \langle odd options\rangle are applied always. For twosided documents, this style is identical to /tcb/if odd page.
This option needs the `breakable` library, see Section 19 on page 388.

For breakable boxes, if the current partial box is on an odd page, the \langle odd options \rangle are applied. On an even page, the \langle even options \rangle are applied. \texttt{/tcb/check odd page} \textsuperscript{P.107} is automatically set for precise even/odd page testing.

In contrast to \texttt{/tcb/\ifoddpage P.107}, \texttt{/tcb/\ifoddpage*} is used on every partial box of a break sequences and not only on the first box. Another difference is that \texttt{/tcb/\ifoddpage*} is applied quite \textit{late} during option processing, while \texttt{/tcb/\ifoddpage \textsuperscript{P.107}} is applied immediately.

\texttt{/tcb/\ifoddpage*} is implemented as \texttt{/tcb/\ifoddpage \textsuperscript{P.107}} packed into \texttt{/tcb/extras \textsuperscript{P.397}}.

\begin{tcolorbox}[breakable,\ifoddpage*={\colback=yellow!50}{\colback=red!50}]
This breakable box is colored in yellow on an odd page and is colored in red on an even page. For every partial box, the test is repeated, i.e. this would give a yellow, red, yellow, red, \ldots\ sequence for a long content.
\end{tcolorbox}

For onesided documents, the \langle odd options \rangle are applied always. For twosided documents, this style is identical to \texttt{/tcb/\ifoddpage*}.\\

\begin{tcolorbox}[breakable,\ifoddpage or oneside*={\colback=yellow!50}{\colback=red!50}]
This breakable box is colored in yellow on an odd page and is colored in red on an even page. For every partial box, the test is repeated, i.e. this would give a yellow, red, yellow, red, \ldots\ sequence for a long content.
\end{tcolorbox}
If the current box is on an odd page, the \textit{odd code} is executed. On an even page, the \textit{even code} is executed. For precise even/odd page testing, the \texttt{/tcb/check odd page} \textsuperscript{p.107} has to be set manually inside the box options. The macro \texttt{tcbifoddpage} can be used inside underlay, overlay, or watermark code to test if the box is on an odd page. This will work also for boxes in a break sequence. The macro can also be used inside the box \textit{content text}. For unbreakable boxes, the correct page test is applied. But for \texttt{/tcb/breakable} \textsuperscript{p.390} boxes, \texttt{tcbifoddpage} will always give the result for the page of the first box inside the box \textit{content text}. If needed, the methods from the packages \texttt{changepage} or \texttt{ifoddpage} could be used here.

\begin{tcolorbox}[enhanced,check odd page,
title={Example for a box on an \texttt{tcbifoddpage}\{odd\}{even} page},
watermark text={\texttt{tcbifoddpage}\{Odd\}{Even} page!}]
\lipsum[1]
\end{tcolorbox}


For onesided documents, the \textit{odd code} is executed always. For twosided documents, this macro is identical to \texttt{tcbifoddpage}.

\begin{tcolorbox}[colframe=blue!75!black,colback=white,fonttitle=\bfseries]
\begin{verbatim}
\texttt{tcbset}\{colframe=blue!75!black,colback=white,fonttitle=\textbf{bfseries}\}
\begin{tcolorbox}[enhanced,check odd page,
title={Example for a box on an \texttt{tcbifoddpage}\{odd\}{even} page},
watermark text={\texttt{tcbifoddpage}\{Odd\}{Even} page!}]
\lipsum[1]
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}
This is a unique identifier (arabic number) for a tcolorbox. It is locally defined inside boxes and has no meaning outside. It is used for precise even/odd page testing, but may also be valuable for elaborate user code.

\begin{tcolorbox}[colback=yellow!5,title=Box \thetcolorboxnumber]
This box is \thetcolorboxnumber. \tcb[on line,size=fbox]{This box is \thetcolorboxnumber} and \tcb[on line,size=fbox]{this box is \thetcolorboxnumber}. This box is \thetcolorboxnumber. \end{tcolorbox}

Box 1162
\begin{itemize}
\item This box is 1162.
\item this box is 1163.
\item this box is 1164.
\end{itemize}
This box is 1162.

This macro contains the expanded arabic page number of the current tcolorbox. It is locally defined inside boxes and has no meaning outside. It is precise only, if /tcb/check odd page was set.

\begin{tcolorbox}[colback=yellow!5,check odd page, title=Box on page~\thetcolorboxpage]
This box is located on page~\thetcolorboxpage. \end{tcolorbox}

Box on page 110
This box is located on page 110.
4.23 Externalization

See Section 25 on page 475 for the \texttt{external} library of \texttt{tcolorbox}.

If the \texttt{externalization} library of the \texttt{tikz} package is used and \texttt{/tcb/graphical environment} \textsuperscript{P.142} is set to \texttt{tikzpicture}, a \texttt{tcolorbox} could trigger the externalization process which will arise a compilation error.

To avoid this, there are two possible strategies:

- Ensure, that \texttt{\tikzexternaldisable} is set before a \texttt{tcolorbox} is used. If you typically use the pattern \texttt{\tikzexternalenable some picture \tikzexternaldisable}, there is nothing to care about.

- If \texttt{externalization} is enabled globally, use \texttt{/tcb/shield externalize} to shield any \texttt{tcolorbox}. The preamble code could look like this:

\begin{verbatim}
\usetikzlibrary{external}
\tikzexternalize
\tcbset{shield externalize}
\end{verbatim}

\texttt{/tcb/shield externalize=true|false} \hspace{1cm} (default \texttt{true}, initially \texttt{false})

If set to \texttt{true}, the drawing part of the \texttt{tcolorbox} is not being externalized which is a good thing at the current state of art. Nevertheless, if the \texttt{tcolorbox} contains a \texttt{tikzpicture}, this picture is still externalized. Pictures drawn with help of \texttt{/tcb/tikz upper} \textsuperscript{P.72} or alike are not externalized.

\begin{verbatim}
If a \texttt{tcolorbox} is used inside a node of an encircling \texttt{tikzpicture} which is externalized, do not use \texttt{\tikzexternaldisable} in front of the \texttt{tcolorbox}. \texttt{/tcb/shield externalize} is deactivated automatically inside a \texttt{tikzpicture}.
\end{verbatim}

\begin{verbatim}
\texttt{/tcb/shield externalize} is applied for every following \texttt{tcolorbox} inside the current \TeX group and is not affected by \texttt{/tcb/reset} \textsuperscript{P.112}.
\end{verbatim}

\begin{verbatim}
\texttt{/tcb/external=⟨file name}⟩ \hspace{1cm} (no default, initially unset)

Convenience option which calls \texttt{\tikzsetnextfilename{⟨file name⟩}. Typically, it may be used inside the option list of a \texttt{tcolorbox} to set the externalization ⟨file name⟩ for the first \texttt{tikzpicture} which is discovered \textit{inside} the box content. The package \texttt{tikz} \textsuperscript{[22]} or the library \texttt{skins} has to be loaded to use this option. Additionally, \texttt{\usetikzlibrary{external}} has to be used.

\begin{verbatim}
\texttt{/tcb/remake=true|false} \hspace{1cm} (default \texttt{true}, initially \texttt{false})

Convenience option which calls \texttt{/tikz/external/remake next}. Typically, it may be used inside the option list of a \texttt{tcolorbox} to force the remake of the first \texttt{tikzpicture} which is discovered \textit{inside} the box content. The package \texttt{tikz} \textsuperscript{[22]} or the library \texttt{skins} has to be loaded to use this option. Additionally, \texttt{\usetikzlibrary{external}} has to be used.
\end{verbatim}
4.24 Miscellaneous

/tcb/reset (no value, initially set)

Sets (nearly) all \texttt{tcolorbox} settings (including loaded libraries) back to their default values plus any settings given by \texttt{tcbsetforeverylayer} \textsuperscript{P.13}, \texttt{tcb/savedelimiter} \textsuperscript{P.26}, \texttt{tcb/capture} \textsuperscript{P.100}, and \texttt{tcb/shield externalize} \textsuperscript{P.111} keep their values. Also, all raster values (see Section 16 on page 298) are not resetted.

This option is useful for boxes in boxes where the inner box should not inherit the settings of the outer box. Note that for boxes inside boxes the reset is done automatically, if the standard settings of the package are used (v2.40 and above), see Section 4.16 from page 97.

/tcb/code\langle code\rangle (no default, initially unset)

The given \langle code\rangle is executed immediately. This option is useful to place some arbitrary code into an option list.

\begin{tcolorbox}
\[\text{Useless at this spot but functional.}\]
\\begin{tcolorbox}[title=My working title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}
Annihilates the current \texttt{tcolorbox} as far as possible. Basically, this comments out the whole \texttt{tcolorbox} by using a key. If the option list of the current \texttt{tcolorbox} contains arbitrary code with global impact (like counter settings), these actions are not undone automatically. Nevertheless, the effects of \texttt{/tcb/phantom}→P.104, \texttt{/tcb/step}→P.104, \texttt{/tcb/new/auto counter}→P.114, etc., are removed by \texttt{/tcb/void}.

\begin{tcolorbox}
\begin{quote}
title=This box is completely removed by the following key, void
\end{quote}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This option key cannot be applied for every situation. For example, if several box environments with the same environment name are nested, for the outer environment \texttt{/tcb/void} cannot be used, since the end of the inner environment will be misinterpreted as end of the outer environment. Also, \texttt{/tcb/void} cannot be used for environments wrapped with \texttt{\tcolorboxenvironment}→P.17.

\begin{tcolorbox}
\begin{quote}
title=This box is completely removed by the following key, nirvana
\end{quote}
\end{tcolorbox}

The contents of the current \texttt{tcolorbox} are processed including counter settings, but the box is just not drawn. Therefore, \texttt{/tcb/nirvana} is less radical than \texttt{/tcb/void} and several box environments can be nested without problems.

\begin{tcolorbox}
\begin{quote}
title=This box is completely removed by the following key, nirvana
\end{quote}
This is a \textbf{tcolorbox}.
\begin{tcolorbox}
Nested Box
\end{tcolorbox}
\end{tcolorbox}
5 Initialization Option Keys

The initialization options are only applicable for the generation of new environments and commands based on *tcolorbox* and friends. Particularly, they can be used for

- `{\newtcolorbox} → P.15`,
- `{\newtcbox} → P.16`,
- `{\newtcblisting} → P.324`,
- `{\newtcbinputlisting} → P.326`,
- `{\newtcbtheorem} → P.362`, and
- `{\newtcbx} → P.440`.

Typically, these options may generate counters and alike. It is strongly recommended that you use initialization options inside the preamble only. Otherwise, you may get trouble when using \LaTeX’s `\include` features. Also, it is recommended to generate new environments and commands with these options after \hyperref is loaded to avoid warnings about duplicate identifiers.

5.1 Numbered Boxes

Counters assigned using the initialization options are administrated automatically. Especially, they are increased for each new box. Independent from the real counter name, the counter value can be referenced by `{\thetcbcounter}`, e.g. inside the title of the box. The real counter name is stored inside `{\tcbcounter}`.

/tcb/new/auto counter

Creates a new counter automatically. With `/tcb/new/number format` → P.116 and `/tcb/new/number within` → P.116, the appearance and behavior of the counter can be changed. The counter value is referenced by `{\thetcbcounter}`.

Definition in the preamble:

```latex
\newtcolorbox[auto counter,number within=section]{pabox}[2][]{
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  title=Examp.~\thetcbcounter: #2,#1}
```

Examp. 5.1: Title with number

This box is automatically numbered with 5.1 on page 114. Inside the box, the 5.1 can also be referenced by `{\thetcbcounter}`. The real counter name is `tcb@cnt@pabox`. 

114
/tcb/new/use counter from = \{tcolorbox\}  
(no default, initially unset) 

Here, a counter from another \{tcolorbox\} is reused. Note that the settings for /tcb/new/number format → P.116 and /tcb/new/number within → P.116 are inherited and cannot be changed. The counter value is referenced by \thetcbcounter. 

\newtcolorbox[use counter from=pabox]{mybox}[2][]{
\begin{mybox}[label={myusecounterfrom}]{Title with continued number}
This box is automatically numbered with \ref{myusecounterfrom} on page \pageref{myusecounterfrom}. Inside the box, the \thetcbcounter\ can also be referenced by \thetcbcounter. 
The real counter name is \texttt{tcb@cnt@pabox}.
\end{mybox}

Some Box 5.2: Title with continued number

This box is automatically numbered with 5.2 on page 115. Inside the box, the 5.2 can also be referenced by \thetcbcounter. The real counter name is \texttt{tcb@cnt@pabox}.

/tcb/new/use counter = \{counter\}  
(no default, initially unset) 

Here, an ordinary existing \LaTeX\ \{counter\} is used for numbering. With /tcb/new/number format → P.116 and /tcb/new/number within → P.116, the appearance and behavior of the counter can be changed. The counter value is referenced by \thetcbcounter. 

\newcounter{myexample}\prelude
\newtcolorbox[use counter=myexample,number format=\Alph\]{mybox}[2][]{
\begin{mybox}[label={myusecounter}]{Title with \LaTeX\ number}
This box is automatically numbered with \ref{myusecounter} on page \pageref{myusecounter}. Inside the box, the \thetcbcounter\ can also be referenced by \thetcbcounter. 
The real counter name is \texttt{myexample}.
\end{mybox}

Some Box A: Title with \LaTeX\ number

This box is automatically numbered with A on page 115. Inside the box, the A can also be referenced by \thetcbcounter. The real counter name is \texttt{myexample}.

/tcb/new/use counter** = \{counter\}  
(no default, initially unset) 

An existing \LaTeX\ \{counter\} is used for numbering. In contrast to /tcb/new/use counter, the options /tcb/new/number format → P.116 and /tcb/new/number within → P.116 are ignored. Use this for counters which are already configured outside the tcolorbox package, e.g. the standard figure counter.

/tcb/new/no counter  
(no value, initially set) 

The created boxes are not numbered. This is the default. The option may be used to overrule a previous option.

/tcb/new/reset counter on overlays = true|false  
(default true, initially false) 

For beamer slides, this invokes the \resetcounteronoverlays command for the box counter. The counter is automatically reset on subsequent overlay slides of a frame. Thereby, the counter will be the same on all slides of every frame.
The automatic counter is set to zero, if \textlangle counter\textrangle is increased. Additionally, during output, the value of \textlangle counter\textrangle is prepended to the value of the automatic counter.

To prepend the automatic counter with the chapter number and to reset it with every new chapter, use:

\begin{phbox}[number within=chapter]
\end{phbox}

See \texttt{/tcb/new/use counter} for a complete example.

\texttt{/tcb/new/number format=⟨format macro⟩} (no default, initially \texttt{\arabic})

Declares the format of the automatic counter. The \textlangle format macro\textrangle can be any valid \LaTeX\ number formatting macro like \texttt{\arabic, \roman, etc.}

To display the counter value in large roman numbers, use:

\begin{phbox}[number format=\Roman]
\end{phbox}

See \texttt{/tcb/new/auto counter} for a complete example.

\texttt{/tcb/new/number freestyle=⟨code⟩} (no default, initially unset)

Allows advanced control over the complete number format. This option overrules the format given by \texttt{/tcb/new/number within} and \texttt{/tcb/new/number format}. Nevertheless, you can combine it with \texttt{/tcb/new/number within} to get the desired reset property.

The \textlangle code\textrangle is some formatting code which should contain \texttt{\tcbcounter} to reference the automated counter. Since this \textlangle code\textrangle is expanded, you have to secure each macro with \texttt{\noexpand} with exception of \texttt{\tcbcounter}.

\begin{phbox}[label={myfreestyle}]{Title with freestyle number}
This box is automatically numbered with \texttt{\ref{myfreestyle}} on page \texttt{\pageref{myfreestyle}}. Inside the box, the \texttt{\tcbcounter} can also be referenced by \texttt{\tcbcounter}. The real counter name is \texttt{\texttt{tc@cnt@phbox}}.
\end{phbox}

\texttt{Definition in the preamble:}
\begin{verbatim}
\newtcolorbox[auto counter,number within=section, number freestyle={(Q/\noexpand\thesection/\noexpand\Alph{\tcbcounter})},]{phbox}[2][2]{%
colback=yellow!15!white,colframe=blue!75!black,fonttitle=\bfseries, title=Question \tcbcounter: #2,#1}
\end{verbatim}

\texttt{\begin{phbox}[label={myfreestyle}]\texttt{Title with freestyle number}}
This box is automatically numbered with \texttt{\ref{myfreestyle}} on page \texttt{\pageref{myfreestyle}}. Inside the box, the \texttt{\tcbcounter} can also be referenced by \texttt{\tcbcounter}. The real counter name is \texttt{\texttt{tc@cnt@phbox}}.
\texttt{\end{phbox}}

\texttt{Question (Q/5/A): Title with freestyle number}
This box is automatically numbered with \texttt{(Q/5/A)} on page 116. Inside the box, the \texttt{(Q/5/A)} can also be referenced by \texttt{\tcbcounter}. The real counter name is \texttt{tc@cnt@phbox}.
The following options /tcb/new/crefname and /tcb/new/Crefname need to be set inside the preamble.

/tcb/new/crefname={⟨singular⟩}{⟨plural⟩}  
(no default, initially unset)

This option key can be used only in conjunction with the cleveref package [5] which has to be loaded separately. It creates a cross-reference type for the new \tcolorbox'es, where the lowercase ⟨singular⟩ and ⟨plural⟩ forms of the cross-reference are given. This type is the environment or macro name and /tcb/label type → P.104 is set automatically. See /tcb/label type → P.104 and [5] for more information.

/tcb/new/Crefname={⟨singular⟩}{⟨plural⟩}  
(no default, initially unset)

This option key can be used only in conjunction with the cleveref package [5] which has to be loaded separately. It creates a cross-reference type for the new \tcolorbox'es, where the uppercase ⟨singular⟩ and ⟨plural⟩ forms of the cross-reference are given. This type is the environment or macro name and /tcb/label type → P.104 is set automatically. See /tcb/label type → P.104 and [5] for more information.

\begin{mybluebox}[label={myreference}]{My title}
This is an example.
\end{mybluebox}

\Cref{myreference}, \cref{myreference}.
\Cpageref{myreference}, \cpageref{myreference}.
\nameCref{myreference}, \namecref{myreference}.
\labelcref{myreference}, \labelcpageref{myreference}.

With \texttt{varioref}:
\Vref{myreference}, \vref{myreference}.
\Vref*{myreference}, \vref*{myreference}.

\begin{mybluebox}
This is an example.
\end{mybluebox}

Bluebox 5.1, bluebox 5.1.
Page 117, page 117.
Bluebox, bluebox.
5.1, 117.

With \texttt{varioref}:
Bluebox 5.1, bluebox 5.1.
Bluebox 5.1, bluebox 5.1.
Used to comfortably blend into an existing schema of naming and numbering for some selected cases. For example, a `tcolorbox` can be used to display and entitle an image pretending to be a standard `figure` environment. Here, `/tcb/title` \(^{P.18}\) is used instead of the standard `\caption` and `/tcb/list text` \(^{P.105}\) can be used instead of the optional parameter of the standard `\caption`.

Feasible values for \langle name \rangle are:

- **figures**: blend into the standard `figure` environment.
- **tables**: blend into the standard `table` environment.
- **listings**: blend into the standard `lstlisting` environment of the package `listings` [6].

```
\begin{figure}[htb]
\centering\includegraphics[height=4cm]{lichtspiel.jpg}
\caption{A standard figure}
\end{figure}
```

```
\newtcolorbox[blend into=figures]{myfigure}[2]{float=htb,capture=hbox,title={#2},every float=\centering,#1}
\begin{myfigure}{A tcolorbox figure}
\includegraphics[height=4cm]{lichtspiel.jpg}
\end{myfigure}
```

---

Note that **blend into=listings** can only be used in the document content or, preferably, inside a `\AtBeginDocument` clause! Using it without `\AtBeginDocument` inside the preamble does not work since the `listings` packages initializes its counter also inside `\AtBeginDocument`.

Figure 1: A standard figure

Figure 2: A tcolorbox figure
This option formats the title output of \texttt{/tcb/new/blend into} \textsuperscript{P.118}. Note that this is a common \texttt{tcolorbox} option which should be set globally or in the normal option part of \texttt{\newtcolorbox} \textsuperscript{P.15}.

Feasible values for \textit{value} are:

- \textbf{colon}: use name/number plus colon.
- \textbf{dash}: use name/number plus dash.
- \textbf{colon hang}: use name/number plus colon with hanging indent.
- \textbf{dash hang}: use name/number plus dash with hanging indent.

\begin{myfigure}{A tcolorbox figure with quite a long title}
\includegraphics[height=5cm]{lichtspiel.jpg}
\end{myfigure}

Figure 3 – A tcolorbox figure with quite a long title
This option formats the title output of `/tcb/new/blend` into → P.118. The `<code>` takes one parameter, the name/number. Use this, if `/tcb/blend before title` → P.119 is not flexible enough.

\begin{myfigure}{A tcolorbox figure}
\includegraphics[height=6cm]{lichtspiel.jpg}
\end{myfigure}
5.2 Lists of tcolorboxes

For figures and tables, \LaTeX{} provides the \texttt{\listoffigures} and \texttt{\listoftables} commands to create lists of these numbered entities. Also, a \texttt{tcolorbox} can be part of such a kind of list.

1. Assign a list \langle name \rangle by the \textit{initialization} option \texttt{/tcb/new/list inside}.
2. Optionally, a new \langle type \rangle for list entries may be assigned by the \textit{initialization} option \texttt{/tcb/new/list type}.
3. List entries a generated automatically within each new \texttt{tcolorbox} using the above initialization.
   \begin{itemize}
   \item If \texttt{/tcb/list entry\_\_P.105} is set, the entry is generated with it.
   \item Otherwise, if \texttt{/tcb/title\_\_P.18} is set, the entry is generated with it.
   \item Otherwise, the entry is generated with the current number and the environment name.
   \end{itemize}
4. The generated list is displayed by \texttt{\tcblistof\_\_P.122}.

\texttt{/tcb/new/list inside=(name)\textcolor{blue}(no default, initially unset)}

Assigns a list or contents file to the generated \texttt{tcolorbox}es. Entries to this list are saved to a file which gets the \langle name \rangle as file name extension. The list is referenced by this name in \texttt{\tcblistof\_\_P.122}. For example:

\begin{verbatim}
list inside=exam
\end{verbatim}

See Section 17.9 from page 356 for a complete example.

\texttt{/tcb/new/list type=(type)\textcolor{blue}(no default, initially \texttt{tcolorbox})}

Optionally, some \langle type \rangle can be assigned to the list entries. For a new \langle type \rangle, a macro \texttt{\l@\langle type \rangle} has to exist which controls the format of the list entry. The default type is defined by

\begin{verbatim}
\newcommand*{\l@tcolorbox}{\@dottedtocline{1}{1.5em}{2.3em}}
\end{verbatim}

This is identical to the \texttt{\l@section} setting of \LaTeX{}. \texttt{\l@tcolorbox} can be redefined or a new \langle type \rangle can be assigned.
\texttt{\texttt{tclistof}} \{\texttt{macro}\}\{\texttt{name}\}\{\texttt{short}\}\{\texttt{title text}\}

Displays the generated list of \texttt{tcolorboxes} with the given \texttt{name}. The heading is generated by \texttt{\{macro\}\{short\}\{title text\}} where \texttt{section} is the default setting for \texttt{\{macro\}}. Here, as usual, \texttt{\{title text\}} is the title of the section or chapter while \texttt{\{short\}} is a shorter title for headings and table of contents.

- If \texttt{\{macro\}} ends with a *, \texttt{tclistof} mimics the behavior of \texttt{\listoffigures} from the standard \texttt{LATEX} classes and adds the title to the left and right mark for headings.
- If \texttt{\{macro\}} starts with \texttt{\chapter}, a possible two column document setting is restored to one column (as standard \texttt{LATEX} classes do for \texttt{\listoffigures}).

To display the list inside a subsection, use for example:

\begin{verbatim}
\texttt{tclistof}\{subsection\}\{exam\}\{List of Exercises\}
\end{verbatim}

The result of the example is found as Subsection 17.10 on page 359.

To apply the list similar to \texttt{\listoffigures} for a report or book, use for example:

\begin{verbatim}
\texttt{tclistof}\{chapter*\}\{exam\}\{List of Exercises\}
\end{verbatim}

To set a short title for headings with the default \texttt{\section} setting, use for example:

\begin{verbatim}
\texttt{tclistof}\{exam\}\{List of Exercises\}\{Elaborate List of Fine Exercises for all Students of my Course\}
\end{verbatim}

! The core of the list is generated by \texttt{\@starttoc\{\texttt{name}\}} which can be wrapped into an own macro.
6 Side by Side

A side by side box is a special \texttt{tcolorbox} where the upper and lower part of the box are set side by side. All boxes of this kind are unbreakable.

Further side by side options for code examples are /tcb/listing side text, /tcb/text side listing, /tcb/listing outside text, and /tcb/text outside listing.

6.1 Basic Settings

\texttt{/tcb/sidebyside=\texttt{true}|\texttt{false}} \hspace{1cm} \text{(default \texttt{true}, initially \texttt{false})}

Normally, the upper part and the lower part of the box have their positions as their names suggest. If \texttt{sidebyside} is set to \texttt{true}, the upper part is drawn \textit{left-handed} and the lower part is drawn \textit{right-handed}. Both parts are drawn together with the geometry settings of the upper part but the space is divided horizontally according to the following options. Colors, fonts, and box content additions are used individually. The resulting box is unbreakable.

\begin{tcolorbox}
\begin{center}
\begin{tabular}{ll}
\texttt{My title} & \\
This is the upper (\textit{left-handed}) part. & This is the lower (\textit{right-handed}) part.
\end{tabular}
\end{center}
\end{tcolorbox}

% \usepackage{lispum}
% \usepackage{tcbuselibrary{skines}
\begin{tcolorbox}[bicolor,sidebyside,righthand width=3cm,
  sharp corners,boxrule=.4pt,colback=green!5,colbacklower=green!50!black!50]
\lispum[2]
\tcblower
\includegraphics[width=\linewidth]{goldshade}
\end{tcolorbox}

Sets the vertical \textit{alignment} for the left-handed and right-handed part. Feasible values for \textit{alignment} are:

- **center**: identical to \texttt{minipage} option \texttt{c}.
- **top**: identical to \texttt{minipage} option \texttt{t} (aligns the top lines of the left-handed and right-handed side according to their baselines).
- **bottom**: identical to \texttt{minipage} option \texttt{b} (aligns the bottom lines of the left-handed and right-handed side according to their baselines).
- **center seam**: aligns the center of the left-handed and right-handed side.
- **top seam**: aligns the very top seam of the left-handed and right-handed side.
- **bottom seam**: aligns the very bottom seam of the left-handed and right-handed side.

\begin{tcolorbox} [adjusted title=center, sidebyside align=center] This is a text which is too long for one line. \tcblower This is a short text. \end{tcolorbox} \hfill \begin{tcolorbox} [adjusted title=top, sidebyside align=top] This is a text which is too long for one line. \tcblower This is a short text. \end{tcolorbox} \hfill \begin{tcolorbox} [adjusted title=bottom, sidebyside align=bottom] This is a text which is too long for one line. \tcblower This is a short text. \end{tcolorbox}

\texttt{center}, \texttt{top}, and \texttt{bottom} are identical to the known corresponding \texttt{minipage} options. While this is the preferred approach for text content, the result for boxed content like tables or images may not be as expected.

For such content, one may use \texttt{center seam}, \texttt{top seam}, and \texttt{bottom seam}. For example, \texttt{top seam} aligns the very top seam of the left-handed and right-handed side.
center seam

This is my description text for the pictures displayed on the right-handed side.

---

top seam

This is my description text for the pictures displayed on the right-handed side.

---

bottom seam

This is my description text for the pictures displayed on the right-handed side.
\texttt{/tcb/sidebyside\ gap=(length)} \hspace{1cm} \text{(no default, initially 10\text{mm})}

Sets the horizontal distance between the left-handed and right-handed part to \(\langle\text{length}\rangle\).

\MakeTCBFixed{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,nobeforeafter,sidebyside,width=(\linewidth-2mm)/2}
\begin{tcolorbox}[adjusted title=Wide gap,sidebyside gap=30mm]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}\fill
\begin{tcolorbox}[adjusted title=Narrow gap,sidebyside gap=1mm]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}

\texttt{/tcb/lefthand\ width=(length)} \hspace{1cm} \text{(no default, initially unset)}

Sets the width of the left-handed part to the given \(\langle\text{length}\rangle\).

\MakeTCBFixed{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title,sidebyside,lefthand width=3cm]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}

\texttt{/tcb/righthand\ width=(length)} \hspace{1cm} \text{(no default, initially unset)}

Sets the width of the right-handed part to the given \(\langle\text{length}\rangle\).

\MakeTCBFixed{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title,sidebyside,righthand width=3cm]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}
Sets the width of the left-handed part to the given \textit{fraction} of the available space. \textit{fraction} is a value between 0 and 1.

\begin{tcolorbox}[title=My title, sidebyside, lefthand ratio=0.25]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}

Sets the width of the right-handed part to the given \textit{fraction} of the available space. \textit{fraction} is a value between 0 and 1.

\begin{tcolorbox}[title=My title, sidebyside, righthand ratio=0.25]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}
If one side of a side-by-side box should be adapted to the width of its content, this width has to be computed beforehand. The following example uses a savebox \mysavebox to store the picture to determine its width. A more convenient way to handle this task is to use the methods from Section 6.2 on page 129.

\begin{tikzpicture}
\fill[red!20,draw=red!50!black]
(0,0) node[below]{A} -- (3,1) node[above]{B}
-- (1,4) node[above]{C} -- cycle;
\end{tikzpicture}

All following macros and options need the \texttt{xparse} library to be loaded, see Section 24 on page 462.

\begin{tcolorbox}[title=The Triangle, sidebyside adapt=left, bicolor,colback=white,colbacklower=yellow!10, fonttitle=\bfseries,center title,drop lifted shadow,]
\begin{tikzpicture}
\path[fill=red!20,draw=red!50!black]
(0,0) node[below]{A} -- (3,1) node[right]{B} -- (1,4) node[above]{C} -- cycle;
\end{tikzpicture}
\end{tcolorbox}

The option allows the left-handed and/or right-handed side to determine the dimensions of the box. This option is only valid inside \texttt{tcb\textbackslash sidebyside} at P.129.

Feasible values for \texttt{(side(s))} are:

- \texttt{none}: no measurement of left-handed and right-handed side.
- \texttt{left}: the actual width of the left-handed content is used to set /tcb/lefthand width at P.126.
- \texttt{right}: the actual width of the right-handed content is used to set /tcb/righthand width at P.126.
- \texttt{both}: the actual width of the left-handed and right-handed content is used to set /tcb/lefthand width at P.126, /tcb/righthand width at P.126, and the overall /tcb/width at P.34.

% \bibliography{skips,xparse}
\begin{tcbinput}{sidebyside adapt=left,
title=Very important table,
beamer,colframe=blue!50!black,colback=blue!10,
lower separated=false,sidebyside gap=5mm}
\begin{threebody}{}
\begin{tabular}{|l|c|r|}
\hline
left & center & right \\
\hline
A & B & C \\
\hline
D & E & F \\
\hline
\end{tabular}
\end{threebody}
\end{tcbinput}
This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.

Very important table

<table>
<thead>
<tr>
<th>left</th>
<th>center</th>
<th>right</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
</tbody>
</table>

This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.

% \bibliography{skips,xparse}
\begin{tcbinput}{sidebyside adapt=right,
blanker,sidebyside gap=5mm}
\lipsum[2]
}\end{tcbinput}

<table>
<thead>
<tr>
<th>left</th>
<th>center</th>
<th>right</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
</tbody>
</table>
/tcb/sidebyside \textbf{switch=\textit{true|false}} (default \textit{true}, initially \textit{false})

If set to \textit{true}, the \langle\textit{left-handed content}\rangle and \langle\textit{right-handed content}\rangle of \texttt{tcb/sidebyside} \textsuperscript{P.129} are switched. Obviously, this option is only valid inside \texttt{tcb/sidebyside} \textsuperscript{P.129}.

The side switching can be made even/odd page sensitive, if used inside \texttt{/tcb/if odd page} \textsuperscript{P.107}.

\begin{verbatim}
\% \tcbuselibrary{skins,xparse}
\tcbsidebyside[title=Very important table,
   if odd page={sidebyside switch,sidebyside adapt=right,flushright title}]
   \begin{tabular}{|l|c|r|}
   \hline
   left & center & right \\
   A & B & C \\
   D & E & F \\
   \hline
   \end{tabular}
\end{verbatim}

This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.
7 Saving and Loading of Verbatim Texts

The following macros are slightly modified versions of the original macros from the known packages `moreverb` and `verbatim`. They are used implicitly inside of a `tcolorbox` environment, but they can be used outside also.

\begin{tcbverbatimwrite}{⟨file name⟩}
⟨environment content⟩
\end{tcbverbatimwrite}

Saves the ⟨environment content⟩ to a file named by ⟨file name⟩. TeX macros inside the environment are not expanded.

\begin{tcbverbatimwrite}{\jobname_myverb.tex}
This is the text which is saved by my own environment.
\end{tcbverbatimwrite}

Now, we are using the file:
\input{\jobname_myverb.tex}

This environment may be used inside an own environment. Note, that inside the environment definition \texttt{tcbverbatimwrite} has to be used instead of \texttt{begin{tcbverbatimwrite}} and \texttt{\end{tcbverbatimwrite}} instead of \texttt{end{tcbverbatimwrite}}.

\begin{nevenvironment}{myverbatim}\
\begin{tcbverbatimwrite}{\jobname_myverb.tex}\end{tcbverbatimwrite}\
\end{nevenvironment}

\begin{myverbatim}
This is the text which is saved by my own environment.
\end{myverbatim}

Now, we are using the file:
\input{\jobname_myverb.tex}

\begin{tcbwritetemp}
⟨environment content⟩
\end{tcbwritetemp}

Has the same function as \texttt{tcbverbatimwrite}, but uses the key value of \texttt{tempfile} for the file name.

\begin{tcbwritetemp}
This text is saved \textit{as is}.
\end{tcbwritetemp}

Now, we are using the file:\par
\tcbusetemp
\begin{tcbwritetemp}
This text is saved \textit{as is}.
\end{tcbwritetemp}

\tcbusetemp

Loads the current temporary file which was saved by \texttt{tcbwritetemp}.
If this option is set to be `true`, the percent sign % is silently ignored for `tcbverbatimwrite` \(^\text{P.133}\) and all macros and environments which are built using `tcbverbatimwrite` \(^\text{P.133}\), e.g. `tcbwritetemp` \(^\text{P.133}\), `tcblisting` \(^\text{P.321}\), or `dispExample` \(^\text{P.495}\).

This option may be useful for creating some special effects, but mainly it is intended to be applied for documentation with DocStrip. The creation of this option was motivated by Yudai Nakata. Note that this option is not getting reset by `/tcb/reset` \(^\text{P.112}\).

Normal usage:
\begin{tcbwritetemp}
\%\begin{center}\bfseries
This is my text.
\end{center}
\end{tcbwritetemp}
\tcbusetemp
\tcbset{verbatim ignore percent}

Option applied:
\begin{tcbwritetemp}
\%\begin{center}\bfseries
This is my text.
\end{center}
\end{tcbwritetemp}
\tcbusetemp

Note that every percent sign is removed, also escaped ones.

Normal
\begin{tcblisting}{\textbf{title}=Normal}
\%\begin{center}\bfseries
This is my 5\% text and this is my 10\% text.
\end{center}
\end{tcblisting}

Option applied
\begin{tcblisting}{title=Option applied,\verbatim ignore percent}
This is my 5\% text and this is my 10\% text.
\end{tcblisting}
8 Recording

The package provides some macros and options to take records during compilation. This is done by \LaTeX file operations to save some data to a file for later usage. The main application scenario is depicted in Section 8.3 on the next page where information about example solutions is recorded and read again in Section 8.4 on page 139.

8.1 Macros

\begin{Macro}{\texttt{tcbstartrecording}[\langle file name\rangle]}\end{Macro}

Opens a file denoted by \langle file name\rangle for writing the records. The default file name is \jobname.records. See Section 8.3 on the next page for an example application.

In some situations, a not existing optional parameter may cause parsing problems. If this happens (or just for precaution), use

\begin{Verbatim}
\tcbstartrecording\relax
\end{Verbatim}

or

\begin{Verbatim}
\tcbstartrecording[\jobname.records]
\end{Verbatim}

\begin{Macro}{\texttt{tcbrecord}}{\langle content\rangle}\end{Macro}

Records any \langle content\rangle to the record file. \tcbrecord is implemented as \immediate\write. \tcbstartrecording has to be called before; otherwise, \tcbrecord is silently ignored.

\begin{Verbatim}
\tcbrecord{\string\solution{\thetcbcounter}{solutions/exercise-\thetcbcounter.tex}}
\end{Verbatim}

\begin{Macro}{\texttt{tcbstoprecording}}\end{Macro}

Closes the current record file which was opened by \tcbstartrecording before.

\begin{Macro}{\texttt{tcbinputrecords}[\langle file name\rangle]}\end{Macro}

Opens a file denoted by \langle file name\rangle for reading the records via \input. The default file name is the name of the last used record file for saving. \tcbstoprecording has to be called before.

8.2 Options

\begin{Option}{\texttt{/tcb/record}}{\langle content\rangle}\end{Option}

(style, no default)

Records any \langle content\rangle to the record file, see \tcbrecord. This key can be used several times to write several lines.

\begin{Verbatim}
record={\string\solution{\thetcbcounter}{solutions/exercise-\thetcbcounter.tex}}
\end{Verbatim}

\begin{Option}{\texttt{/tcb/no recording}}\end{Option}

Disables \tcbrecord and \texttt{/tcb/record} inside the current group.
8.3 Example: Exercises

The following application example creates exercises and their corresponding solutions. Each pair is generated inside a single `tcolorbox` where the solution is given below. For every example, the solution part is saved by `/tcb/savelowerto` to a file. The saving is recorded using `/tcb/record` to enlighten the possibilities, the second exercise has no solution. Finally, the solutions are input in Section 8.4 on page 139.

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x) = \sin((\sin x)^2)
\end{equation*}
\tcblower
The derivative is:
\begin{align*}
f'(x) &= \left( \sin((\sin x)^2) \right)' \\
&= \cos((\sin x)^2) 2\sin x \cos x.
\end{align*}
\end{exercise}

\begin{solution}{exercise@1}
\begin{align*}
f'(x) &= \cos((\sin x)^2) 2\sin x \cos x.
\end{align*}
\end{solution}

\begin{solution}{exercise@2}
\begin{align*}
f'(x) &= \cos((\sin x)^2) 2\sin x \cos x.
\end{align*}
\end{solution}
\begin{exercise}[no solution]
It holds:
\begin{equation*}
\frac{d}{dx}\left(\ln|x|\right) = \frac{1}{x}.
\end{equation*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)=(\sin(\sin x))^2
\end{equation*}
The derivative is:
\begin{align*}
f'(x) &= (\sin(\sin x))^2 \cos(\sin x) \cos x.
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)=\sqrt{x^3-6x^2+2x}
\end{equation*}
The derivative is:
\begin{align*}
f'(x) &= \frac{3x^2-12x+2}{2\sqrt{x^3-6x^2+2x}}.
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)=\left(\frac{2+3x}{1-2x}\right)^3
\end{equation*}
The derivative is:
\begin{align*}
f'(x) &= 3 \left(\frac{2+3x}{1-2x}\right)^2 \frac{(1-2x)3-(2+3x)(-2)}{(1-2x)^2}
= \frac{21(2+3x)^2}{(1-2x)^4}.
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)=\frac{\cos x}{(\tan 2x)^2}
\end{equation*}
The derivative is:
\begin{align*}
f'(x) &= \frac{(\sin 2x)^2 \left([-\sin x] \cos 2x)^2+(\cos x)^4 \cos 2x \ (-\sin 2x)\right)
- \cos x \ (\cos 2x)^2 \sin 2x \ (\cos 2x)^2+(\sin 2x)^4\right)
\end{align*}
\end{exercise}
\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x) = \cos((2x^2+3)^3)
\end{equation*}
\end{exercise}

The derivative is:
\begin{align*}
f'(x) &= \left( \cos((2x^2+3)^3) \right)' \\
&= -\sin((2x^2+3)^3) \cdot 3(2x^2+3)^2 \cdot 2 \\
&= -12x(2x^2+3)^2 \sin((2x^2+3)^3).
\end{align*}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x) = (x^2+1)\sqrt{x^4+1}
\end{equation*}
\end{exercise}

The derivative is:
\begin{align*}
f'(x) &= \left( (x^2+1)\sqrt{x^4+1} \right)' \\
&= 2x\sqrt{x^4+1} + \frac{2x^3(x^2+1)}{\sqrt{x^4+1}}.
\end{align*}

Exercise 8.1: Compute the derivative of the following function:
\[ f(x) = \sin((\sin x)^2) \]

Exercise 8.2: It holds:
\[ \frac{d}{dx}(\ln x) = \frac{1}{x} \]

Exercise 8.3: Compute the derivative of the following function:
\[ f(x) = (\sin(\sin x))^2 \]

Exercise 8.4: Compute the derivative of the following function:
\[ f(x) = \sqrt{x^3 - 6x^2 + 2x} \]
Exercise 8.5: Compute the derivative of the following function:

\[ f(x) = \left( \frac{2 + 3x}{1 - 2x} \right)^3 \]

Solution on page 140

Exercise 8.6: Compute the derivative of the following function:

\[ f(x) = \frac{\cos x}{(\tan 2x)^2} \]

Solution on page 140

Exercise 8.7: Compute the derivative of the following function:

\[ f(x) = \cos((2x^2 + 3)^3) \]

Solution on page 140

Exercise 8.8: Compute the derivative of the following function:

\[ f(x) = (x^2 + 1)\sqrt{x^4 + 1} \]

Solution on page 140

8.4 Example: Solutions

This concludes the example given in Section 8.3 on page 136. Now, the saved and recorded solutions are included.

Solution of Exercise 8.1 on page 138:
The derivative is:

\[ f'(x) = \left( \sin((\sin x)^2) \right)' = \cos((\sin x)^2)2\sin x \cos x. \]

Solution of Exercise 8.3 on page 138:
The derivative is:

\[ f'(x) = \left( (\sin(\sin x))^2 \right)' = 2\sin(\sin x)\cos(\sin x) \cos x. \]

Solution of Exercise 8.4 on page 138:
The derivative is:

\[ f'(x) = \left( \sqrt{x^3 - 6x^2 + 2x} \right)' = \frac{3x^2 - 12x + 2}{2\sqrt{x^3 - 6x^2 + 2x}}. \]
Solution of Exercise 8.5 on page 139:
The derivative is:
\[ f'(x) = \left( \frac{2 + 3x}{1 - 2x} \right)' = 3 \left( \frac{2 + 3x}{1 - 2x} \right)^2 \frac{(1 - 2x)3 - (2 + 3x)(+2)}{(1 - 2x)^2} = \frac{21(2 + 3x)^2}{(1 - 2x)^4}. \]

Solution of Exercise 8.6 on page 139:
The derivative is:
\[ f''(x) = \left( \frac{\cos x}{(\tan 2x)^2} \right)' = \left( \frac{\cos x(\cos 2x)^2}{(\sin 2x)^2} \right)' = (\sin 2x)^2 [(-\sin x)(\cos 2x)^2 + (\cos x)4(\cos x)(-\sin 2x)] - \cos x(\cos 2x)^24\sin 2x\cos 2x \]
\[ = \frac{\cos(2x)\sin x \sin 2x \cos 2x + 4 \cos x(\sin 2x)^2 + 4 \cos x(\cos 2x)^2]}{(\sin 2x)^3} = \frac{\cos(2x)\sin x \sin 2x \cos 2x + 4 \cos x}{(\sin 2x)^3}. \]

Solution of Exercise 8.7 on page 139:
The derivative is:
\[ f'(x) = \left( \cos((2x^2 + 3)^3) \right)' = -\sin((2x^2 + 3)^3)3(2x^2 + 3)^22x \]
\[ = -12x(2x^2 + 3)^2 \sin((2x^2 + 3)^3). \]

Solution of Exercise 8.8 on page 139:
The derivative is:
\[ f''(x) = \left( (x^2 + 1)\sqrt{x^4 + 1} \right)' = 2x\sqrt{x^4 + 1} + \frac{2x^3(x^2 + 1)}{\sqrt{x^4 + 1}}. \]
9 Technical Overview and Customization

This section provides a technical overview of the skin concept of \texttt{tcolorbox}. For most applications of \texttt{tcolorbox}, one will not need to know the bells and whistles described herein. You may proceed to Section 10 on page 156 where the customization options for most users are documented.

The following explanations also cover options and settings from the \texttt{skins} library, see Section 10 on page 156.

9.1 Skins and Drawing Engines

From a technical point of view, a \textit{skin} is a style definition for the appearance of a \texttt{tcolorbox}. The core package provides some additional option keys for skins but only two skins called \texttt{standard} \textsuperscript{P.216} and \texttt{standard jigsaw} \textsuperscript{P.217}. The \texttt{skins} library adds several more skins. To change to a skin, only one option from the core package has to be set.

\begin{verbatim}
/tcb/skin=(name) \hspace{1cm} (style, no default, initially standard)
\end{verbatim}

Sets the current skin to \texttt{(name)}. This is a style definition which sets all the following keys, i.e. for many use cases there is nothing more to do.

\begin{verbatim}
\tcbset{colback=Salmon!50!white,colframe=FireBrick!75!black, width=(\linewidth-8mm)/2,before=,after=\hfill,equal height group=ske}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[beamer,adjusted title=My title]
This is my content.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
/tcb/skin first=(name) \hspace{1cm} (style, no default, initially standard)
\end{verbatim}

If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.390} and is broken actually, then the skin for the \textit{first} part of the break sequence is set to \texttt{(name)}, see Subsection 19.8 on page 404. Typically, this key is set by a \texttt{/tcb/skin}.

\begin{verbatim}
/tcb/skin middle=(name) \hspace{1cm} (style, no default, initially standard)
\end{verbatim}

If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.390} and is broken actually, then the skin for the \textit{middle} parts (if any) of the break sequence is set to \texttt{(name)}, see Subsection 19.8 on page 404. Typically, this key is set by a \texttt{/tcb/skin}.

\begin{verbatim}
/tcb/skin last=(name) \hspace{1cm} (style, no default, initially standard)
\end{verbatim}

If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.390} and is broken actually, then the skin for the \textit{last} part of the break sequence is set to \texttt{(name)}, see Subsection 19.8 on page 404. Typically, this key is set by a \texttt{/tcb/skin}. 

141
/tcb/graphical environment=(name) (no default, initially pgfpicture)

Sets the graphical environment for the tcolorbox to (name). Feasible values are pgfpicture and tikzpicture or environments which inherit from one of these two. This key is set by a /tcb/skin → P.141 and may seldom be used directly.

The skin of a tcolorbox is drawn by up to four engines. Afterwards, the text content is drawn which is not part of a skin. The four steps are:

1. The frame of the box, drawn by /tcb/frame engine.
2. The interior of the box. The interior of a box with title is drawn differently from a box without title. /tcb/interior titled engine or /tcb/interior engine → P.143 is used to draw the interior.
3. The segmentation (line) of the box, if there is a lower part; drawn by /tcb/segmentation engine → P.143.
4. The title area of the box, if there is a title and /tcb/title filled → P.27 is set to true; drawn by /tcb/title engine → P.143.

/tcb/frame engine=(name) (no default, initially standard)

Sets the frame drawing engine for a box to (name). Typically, this key is set by a /tcb/skin → P.141. Feasible values for (name) are:
- standard: the original code from the core package,
- path: a tikz path which is controlled by /tcb/frame style → P.156,
- pathjigsaw: a tikz path which is controlled by /tcb/frame style → P.156,
- pathfirst: a tikz path which is controlled by /tcb/frame style → P.156,
- pathfirstjigsaw: a tikz path which is controlled by /tcb/frame style → P.156,
- pathmiddle: a tikz path which is controlled by /tcb/frame style → P.156,
- pathmiddlejigsaw: a tikz path which is controlled by /tcb/frame style → P.156,
- pathlast: a tikz path which is controlled by /tcb/frame style → P.156,
- pathlastjigsaw: a tikz path which is controlled by /tcb/frame style → P.156,
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.

/tcb/interior titled engine=(name) (no default, initially standard)

Sets the interior drawing engine for a titled box to (name). Typically, this key is set by a /tcb/skin → P.141. Feasible values for (name) are:
- standard: the original code from the core package,
- path: a tikz path which is controlled by /tcb/interior style → P.157,
- pathfirst: a tikz path which is controlled by /tcb/interior style → P.157,
- pathmiddle: a tikz path which is controlled by /tcb/interior style → P.157,
- pathlast: a tikz path which is controlled by /tcb/interior style → P.157,
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.
\texttt{/tcb/interior engine=⟨name⟩} \hspace{1cm} (no default, initially \texttt{standard})

Sets the \textit{interior} \textcolor{blue}{drawing engine} for an untitled box to \texttt{⟨name⟩}. Typically, this key is set by a \texttt{/tcb/skin} \texttt{→ P.141}. Feasible values for \texttt{⟨name⟩} are:

- \texttt{standard}: the original code from the core package,
- \texttt{path}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style} \texttt{→ P.157},
- \texttt{pathfirst}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style} \texttt{→ P.157},
- \texttt{pathmiddle}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style} \texttt{→ P.157},
- \texttt{pathlast}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style} \texttt{→ P.157},
- \texttt{freelance}: deprecated.
- \texttt{spartan}: a quite spartan code.
- \texttt{empty}: draw nothing.

\texttt{/tcb/segmentation engine=⟨name⟩} \hspace{1cm} (no default, initially \texttt{standard})

Sets the \textit{segmentation} \textcolor{blue}{(line) drawing engine} for a box to \texttt{⟨name⟩}. Typically, this key is set by a \texttt{/tcb/skin} \texttt{→ P.141}. Feasible values for \texttt{⟨name⟩} are:

- \texttt{standard}: the original code from the core package,
- \texttt{path}: a \texttt{tikz} path which is controlled by \texttt{/tcb/segmentation style} \texttt{→ P.159},
- \texttt{freelance}: deprecated.
- \texttt{spartan}: a quite spartan code.
- \texttt{empty}: draw nothing.

\texttt{/tcb/title engine=⟨name⟩} \hspace{1cm} (no default, initially \texttt{standard})

Sets the \textit{title area} \textcolor{blue}{drawing engine} for a titled box to \texttt{⟨name⟩}. Typically, this key is set by a \texttt{/tcb/skin} \texttt{→ P.141}. Feasible values for \texttt{⟨name⟩} are:

- \texttt{standard}: the original code from the core package,
- \texttt{path}: a \texttt{tikz} path which is controlled by \texttt{/tcb/title style} \texttt{→ P.159},
- \texttt{pathfirst}: a \texttt{tikz} path which is controlled by \texttt{/tcb/title style} \texttt{→ P.159},
- \texttt{pathmiddle}: a \texttt{tikz} path which is controlled by \texttt{/tcb/title style} \texttt{→ P.159},
- \texttt{pathlast}: a \texttt{tikz} path which is controlled by \texttt{/tcb/title style} \texttt{→ P.159},
- \texttt{freelance}: deprecated.
- \texttt{spartan}: a quite spartan code.
- \texttt{empty}: draw nothing.

After an engine is set to an initializing value, the resulting graphical code can be changed using code option keys, see Section 9.2 on page 145.
If set to `true`, up to four `tikz` nodes are defined for a `tcolorbox` which are named `frame`, `interior`, `segmentation`, and `title`. These nodes describe the boundaries of the equally named parts of a `tcolorbox`. They are used by most engines based on TikZ. Typically, this key is set automatically by a `/tcb/skin`.

```latex
\tcbset{colback=Salmon!50!white,colframe=FireBrick!75!black, width=(\linewidth-8mm)/2,before=,after=\hfill,equal height group=geon}

\begin{tcolorbox}[adjusted title=The title]
\textbf{The upper part.}\tcblower The lower part.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,adjusted title=The title, frame code={\path[draw=red,fill=red!25] (frame.south west) rectangle (frame.north east);}, interior titled code={\path[draw=blue,fill=blue!25] (interior.south west) rectangle (interior.north east);}, segmentation code={\path[draw=green,fill=green!25] (segmentation.south west) rectangle (segmentation.north east);}, title code={\path[draw=black,fill=brown!75!black] (title.south west) rectangle (title.north east);}]
\textbf{The upper part.}\tcblower The lower part.
\end{tcolorbox}
```

![Diagram](image-url)
9.2 Code Option Keys

The following code options are applicable for all skins. The used \textit{graphical code} can be any \texttt{pgf} code. For all skins with exception of \texttt{standard} \citep{P.216} and \texttt{standard jigsaw} \citep{P.217}, the \textit{graphical code} can also be any \texttt{TikZ} code.

\texttt{/tcb/frame code=⟨graphical code⟩} \hspace{1em} (code, default from \texttt{standard})

The given \textit{graphical code} is used for drawing the \textit{frame} of the box.

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[enhanced,frame code={
\foreach \n in {north east,north west,south east,south west} {
\path [fill=red!75!black] (interior.\n) circle (3mm); }; }]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/frame empty} \hspace{1em} (style, no value)

This is a shortcut for setting \texttt{/tcb/frame code} to empty. This option removes the drawing of the frame. Alternatively, use \texttt{/tcb/frame hidden} \citep{P.157}.

\texttt{/tcb/interior titled code=⟨graphical code⟩} \hspace{1em} (code, default from \texttt{standard})

The given \textit{graphical code} is used for drawing the \textit{interior} of the box, if the box comes with a title.

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,interior titled code={
\path [draw=red!5!white,line width=5mm,line cap=round] {
([xshift=3mm,yshift=-3mm]interior.north west) --([xshift=-3mm,yshift=3mm]interior.south east)
([xshift=3mm,yshift=3mm]interior.south west) --([xshift=-3mm,yshift=-3mm]interior.north east);}
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/interior titled empty} \hspace{1em} (style, no value)

This is a shortcut for setting \texttt{/tcb/interior titled code} to empty. This option removes the drawing of the untitled interior. Alternatively, use \texttt{/tcb/interior hidden} \citep{P.158}.

145
/tcb/interior code=(graphical code) (code, default from standard)

The given ⟨graphical code⟩ is used for drawing the interior of the box, if the box is without a title.

/tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[enhanced,interior code={
\path[draw=red!5!white,line width=5mm,line cap=round]
 ([xshift=3mm,yshift=-3mm]interior.north west)
 --([xshift=-3mm,yshift=3mm]interior.south east)
 ([xshift=3mm,yshift=3mm]interior.south west)
 --([xshift=-3mm,yshift=-3mm]interior.north east);}]\]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.

/t tcb/interior empty (style, no value)

This is a shortcut for setting /tcb/interior code to empty. This option removes the drawing of the interior. Alternatively, use /tcb/interior hidden \textsuperscript{P.158}.

/tcb/segmentation code=(graphical code) (code, default from standard)

The given ⟨graphical code⟩ is used for drawing the segmentation area of the box.

/tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,segmentation code={
\path[top color=red!5!white,bottom color=red!5!white,middle color=blue]
 (segmentation.south west) rectangle (segmentation.north east);}]\]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title

This is a \textbf{tcolorbox}.

This is the lower part.

/t tcb/segmentation empty (style, no value)

This is a shortcut for setting /tcb/segmentation code to empty. This option removes the drawing of the segmentation line. Alternatively, use /tcb/segmentation hidden \textsuperscript{P.159}.

146
/tcb/title code = (graphical code)  

The given (graphical code) is used for drawing the title area of the box.

```
\tcblset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, coltitle=black}
\begin{tcolorbox}[enhanced,title=My title,title code={
  \path[draw=yellow,solid,decorate,line width=2mm, 
  decoration={coil,aspect=0,segment length=10.1mm}]
  ([xshift=1mm]title.west) -- ([xshift=-1mm]title.east);}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title
This is a tcolorbox.
This is the lower part.

/tcb/title empty  

This is a shortcut for setting /tcb/title code to empty. This option removes the drawing of the title area. Alternatively, use /tcb/title hidden → P.160.
9.3 Subskins

A subskin is a new \texttt{/tcb/skin}\textsuperscript{P.141} based on an existing skin which is extended or changed.

\begin{tcolorbox}
\texttt{\textbackslash tcbsubskin}\{\langle name\rangle\}\{\langle base skin\rangle\}\{\langle options\rangle\}

Creates a new skin \langle name\rangle which inherits all properties of an existing \langle base skin\rangle plus the given \langle options\rangle. The new skin \langle name\rangle can be used as value for the keys \texttt{/tcb/skin}\textsuperscript{P.141}, \texttt{/tcb/skin first}\textsuperscript{P.141}, \texttt{/tcb/skin middle}\textsuperscript{P.141}, and \texttt{/tcb/skin last}\textsuperscript{P.141}. As \langle base skin\rangle, one can take \texttt{standard}\textsuperscript{P.216}, \texttt{empty}\textsuperscript{P.251}, \texttt{enhanced}\textsuperscript{P.218}, or any skin from the \texttt{skins} library, see Section 10 on page 156.

\% \texttt{/tcbuselibrary{skins}}
\texttt{\textbackslash tcbsubskin\{mycross\}\{empty\}\{frame code={\%
\texttt{\textbackslash draw}[red, line width=5pt] (frame.south west)--(frame.north east);
\texttt{\textbackslash draw}[red, line width=5pt] (frame.north west)--(frame.south east);},
\texttt{skin first=mycross, skin middle=mycross, skin last=mycross}\}\
\texttt{\textbackslash begin\{tcolorbox\}\{skin=mycross\}
This is my content.
\texttt{\textbackslash end\{tcolorbox\}}}
\end{tcolorbox}

\texttt{/tcb/skin first is subskin of=\{\langle base skin\rangle\}\{\langle options\rangle\}} \quad \text{(no default, initially unset)}

Creates a new unnamed skin which inherits all properties of an existing \langle base skin\rangle plus the given \langle options\rangle. This skin is set as \texttt{/tcb/skin first}\textsuperscript{P.141}. See a detailed example on page 257.

\texttt{/tcb/skin middle is subskin of=\{\langle base skin\rangle\}\{\langle options\rangle\}} \quad \text{(no default, initially unset)}

Creates a new unnamed skin which inherits all properties of an existing \langle base skin\rangle plus the given \langle options\rangle. This skin is set as \texttt{/tcb/skin middle}\textsuperscript{P.141}. See a detailed example on page 257.

\texttt{/tcb/skin last is subskin of=\{\langle base skin\rangle\}\{\langle options\rangle\}} \quad \text{(no default, initially unset)}

Creates a new unnamed skin which inherits all properties of an existing \langle base skin\rangle plus the given \langle options\rangle. This skin is set as \texttt{/tcb/skin last}\textsuperscript{P.141}. See a detailed example on page 257.
9.4 Drawing Scheme

Depending on the complexity of a \texttt{tcolorbox} definition, the resulting box is drawn in a more or less complex series of steps.

To document and demonstrate these drawing steps, we consider the following box definition:

\begin{verbatim}
\newtcolorbox{testbox}[1][]\{enhanced,title=Test Box,
  boxrule=1mm,titlerule=0.5mm,colframe=blue!50!black,
  interior style={top color=blue!20!green!50!white,bottom color=blue!20!yellow!50!white},
  colbacktitle=blue!50!green!90!white,
  segmentation style={solid},
  fonttitle=\bfseries,drop fuzzy shadow,
  borderline={0.3mm}{0.35mm}{yellow!50!white},
  underlay={\path[fill image opacity=0.15,fill image scale=0.9,
    fill stretch picture={\draw[blue,line width=2mm] circle (1);}
    (interior.south west) rectangle (interior.north east);},
  watermark text={Watermark},watermark color={green!20!white},
  finish={\begin{tcbclipframe}
    \path[bottom color=black,top color=black!50!white,opacity=0.1]
    (frame.south west) -- (frame.south east) -- (frame.north east) -- cycle;
    \path[top color=white,bottom color=black!50!white,opacity=0.1]
    (frame.south west) -- (frame.north east) -- (frame.north west) -- cycle;
    \end{tcbclipframe}}\}
\end{verbatim}

For this definition, we get the maximal number of drawing steps:

- Section 10.6 on page 191.

1. shadow

2. frame

- /tcb/colframe $^\text{P.27}$, /tcb/opacityframe $^\text{P.51}$
- /tcb/frame code $^\text{P.145}$
- /tcb/frame style $^\text{P.156}$

- Section 10.5 on page 186
- Section 10.2 on page 163
- Section 10.8 on page 204
- Section 4.12 on page 74
- Section 10.3 on page 174

All together, the box is drawn:

```latex
\begin{testbox}
\begin{lipsum}[2]
\tcblower
\end{testbox}
```

Section 10.9 on page 206
9.5 Color Names

Color settings for a \texttt{tcolorbox} are saved into named colors which may be used inside a box, e.g. for an overlay. These color names are

- \texttt{tcbcolframe} set by /tcb/colframe → P.27 (frame color)
- \texttt{tcbcolback} set by /tcb/colback → P.27 (background color)
- \texttt{tcbcolbacktitle} set by /tcb/colbacktitle → P.27 (background color of the title)
- \texttt{tcbcolbacklower} set by /tcb/colbacklower → P.232 (skin dependend background color of the lower part; needs \texttt{skins} to be loaded)
- \texttt{tcbcolupper} set by /tcb/colupper → P.28 (text color upper part)
- \texttt{tcbcollower} set by /tcb/collower → P.28 (text color lower part)
- \texttt{tcbcoltitle} set by /tcb/coltitle → P.28 (text color title)

\begin{tcolorbox}[title=Color names, colframe=blue!50!black,colback=blue!5, colbacktitle=blue!50,colupper=red!35!black] \foreach \name in {tcbcolframe,tcbcolback,tcbcolbacktitle,tcbcolbacklower, tcbcolupper,tcbcollower,tcbcoltitle} {\tikz\path[draw,fill=\name] (0,0) rectangle node[right=4mm,font=\ttfamily]{\name} (0.8,0.8);\par} \end{tcolorbox}

\begin{tcolorbox}[title=Color names, colframe=blue!50!black,colback=blue!5, colbacktitle=blue!50,colupper=red!35!black] \foreach \name in {tcbcolframe,tcbcolback,tcbcolbacktitle,tcbcolbacklower, tcbcolupper,tcbcollower,tcbcoltitle} {\tikz\path[draw,fill=\name] (0,0) rectangle node[right=4mm,font=\ttfamily]{\name} (0.8,0.8);\par} \end{tcolorbox}
9.6 Useful Properties

The following macros describe certain properties which may be used for the drawing scheme, see Section 9.4 on page 149. Sometimes, they are even available inside the box content. All of them are considered to be read-only and should never be redefined by the user.

\texttt{\textbackslash tcbheightspace}

If the height of a \texttt{tcolorbox} is not the natural height, the space difference between the forced and the natural size is hold by \texttt{\textbackslash tcbheightspace}. This macro is not usable inside the box content, but for skins or inside \texttt{/tcb/underlay}^{P.204}, \texttt{/tcb/overlay}^{P.74}, etc. If such a space information is needed inside the box content, see \texttt{/tcb/space to}^{P.59} instead.

\begin{verbatim}
\texttt{\% \textbackslash tcbuselibrary\{skins\}
\newtcolorbox\{testbox\}[2][]\{enhanced,size=fbox,
  colframe=blue!75!black,colback=white,height=#2,
  underlay={\node[above,inner sep=3pt] at (interior.south){%
    \includegraphics[width=\texttt{\textbackslash tcbtextwidth},height=\texttt{\textbackslash tcbheightspace}-3pt]{goldshade.png}};
  },
#1\}
\begin{testbox}\{3cm\}
  This is my box. The space is filled with a picture.
\end{testbox}
\begin{testbox}\{2cm\}
  This is my box. The space is filled with a picture.
\end{testbox}
\end{verbatim}

\texttt{\textbackslash tcbtextwidth}

This property describes the box content width.

- If there also is a lower part, it describes the width of the upper part.
- For \texttt{/tcb/sidebyside}^{P.123} boxes, it describes the combined text width plus segmentation.
- This property can be used inside the box content text with exception of \texttt{/tcb/fit}^{P.442} boxes.
- \texttt{\textbackslash tcbtextwidth} can be used for all box types for skins or inside \texttt{/tcb/underlay}^{P.204}, \texttt{/tcb/overlay}^{P.74}, etc.

\begin{verbatim}
\texttt{\begin\{tcolorbox\}[colframe=blue!75!black]
  Inside a box: \texttt{\textbackslash tcbtextwidth} (=\texttt{the\\ linwidth}).
\end\{tcolorbox\}
\end{verbatim}

This property describes the designated box content height. If the box is larger than the natural height, the actual content will be smaller than $\texttt{cbtextheight}$.

- For boxes with a fixed $\texttt{tcb/height}$ \textsuperscript{P.53}, this property can be used inside the box content text. For other boxes, it denotes 0pt inside the box content.
- $\texttt{cbtextheight}$ can be used for all box types for skins or inside $\texttt{tcb/underlay}$ \textsuperscript{P.204}, $\texttt{tcb/overlay}$ \textsuperscript{P.74}, etc.

\begin{tcolorbox}
\begin{tcbraster}
\begin{tcolorbox}[enhanced,colframe=blue!75!black,underlay={\node[light,red] at (frame.east) {Here: \texttt{cbtextheight}};}]\end{tcolorbox}
\begin{tcolorbox}[enhanced,colframe=blue!75!black,height=1cm,underlay={\node[light,red] at (frame.east) {Here: \texttt{cbtextheight}};}]\end{tcolorbox}
\end{tcbraster}
\end{tcolorbox}

Here: 7.95pt

Here: 8.5359pt

\begin{tcbraster}
\begin{tcolorbox}Upper part\end{tcolorbox}
\begin{tcolorbox}Upper part\texttt{tclower} Lower part\end{tcolorbox}
\end{tcbraster}

Upper part

Upper part 1

Lower part

\texttt{tcbsegmentstate}

This macro contains 0, 1, or 2. It is set for every unbroken box and every broken partial box with the following meaning:

- 0: The current (partial) box contains only an upper part.
- 1: The current (partial) box contains an upper and a lower part. The segmentation node can be used for positioning.
- 2: The current (partial) box contains only a lower part. This can only be true for parts of breakable boxes.

Skins like \texttt{bicolor} \textsuperscript{P.230} use this property to paint the (partial) boxes.
10 Library \texttt{skins}

The library is loaded by a package option or inside the preamble by:

\texttt{\tcbuselibrary{skins}}

This also loads the package \texttt{tikz} \cite{tikz}. Typically but not necessarily, the following skins use \texttt{tikz} instead of \texttt{pgf}.

In the following, general settings and options of the library are documented. The actual catalog of skins is found in Section 11 on page 214.

\section{Style Option Keys}

The following style options are applicable for all skins which use engines of type \texttt{path}, \texttt{pathfirst}, \texttt{pathmiddle}, or \texttt{pathlast}. Especially, the skin \texttt{enhanced} \cite{enhanced} supports all of them and \texttt{standard} \cite{standard} none.

\begin{itemize}
  \item \texttt{/tcb/frame style=⟨tikz keys⟩} (style, no default)
  \begin{itemize}
    \item The \texttt{⟨tikz keys⟩} are used inside the \texttt{tikz} path command for drawing the frame of the box.
    \item This option is available if the \texttt{/tcb/frame engine} \cite{frame_engine} is set to \texttt{path}, \texttt{pathfirst}, \texttt{pathmiddle}, or \texttt{pathlast}. It is not available for \texttt{standard}.
  \end{itemize}
\end{itemize}

\begin{itemize}
  \item \texttt{/tcb/frame style image=⟨file name⟩} (no default, initially unset)
  \begin{itemize}
    \item Fills the frame with an external image referenced by \texttt{⟨file name⟩}. For advanced features like blending of a picture with the background, use \texttt{/tcb/frame style} together with \texttt{/tikz/fill stretch image} \cite{fill_stretch_image}.
  \end{itemize}
\end{itemize}
/tcb/frame style tile={(graphics options)}{(file name)}  
(no default, initially unset)

Fills the frame with a tile pattern based on an external image referenced by \texttt{(file name)}. The \texttt{(graphics options)} are given to the underlying \texttt{\includegraphics} command. For advanced features like blending of a picture with the background, use /tcb/frame style \texttt{→ P.156} together with /tcb/interior style \texttt{→ P.275}.

\begin{tcolorbox}[enhanced,title=My title,frame style tile={width=1cm}{pink_marble.png}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/frame hidden
(style, no value)

This is a shortcut for \texttt{frame style=\{draw=none,fill=none\}}. Depending on the skin, this option switches off the drawing of the frame. Alternatively, use \texttt{/tcb/frame empty → P.145}.

\begin{tcolorbox}[enhanced,title=My title,frame hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/interior style={(tikz keys)}
(style, no default)

The \texttt{(tikz keys)} are used inside the \texttt{tikz} path command for drawing the \textit{interior} of the box. They are used for the titled and for the untitled version as well. This option is available if the \texttt{/tcb/interior titled engine → P.142} or \texttt{/tcb/interior engine → P.143} is set to \texttt{path}, \texttt{pathfirst}, \texttt{pathmiddle}, or \texttt{pathlast}. It is \textit{not} available for standard.

\begin{tcolorbox}[enhanced,title=My title,interior style={\left color=red!20!white,\right color=yellow!50!white}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
This is the lower part.
/tcb/interior style image={(file name)} (no default, initially unset)

Fills the interior with an external image referenced by \emph{(file name)}. For advanced features like blending of a picture with the background, use \texttt{/tcb/interior style} \texttt{\rightarrow} \texttt{P.157} together with \texttt{/tikz/fill stretch image} \texttt{\rightarrow} \texttt{P.271}.

egin{verbatim}
\tcbset{colframe=red!75!black,fonttitle=bfseries}
\begin{tcolorbox}[enhanced,title=My title, interior style image=goldshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{verbatim}

My title
This is a tcolorbox
This is the lower part.

/tcb/interior style tile={⟨graphics options⟩}{⟨file name⟩} (no default, initially unset)

Fills the interior with a tile pattern based on an external image referenced by \emph{(file name)}. The \emph{⟨graphics options⟩} are given to the underlying \texttt{\includegraphics} command. For advanced features like blending of a picture with the background, use \texttt{/tcb/interior style} \texttt{\rightarrow} \texttt{P.157} together with \texttt{/tikz/fill tile image} \texttt{\rightarrow} \texttt{P.275}.

egin{verbatim}
\tcbset{colframe=red!75!black,fonttitle=bfseries}
\begin{tcolorbox}[enhanced,title=My title, interior style tile={width=2cm}{crinklepaper.png}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{verbatim}

My title
This is a tcolorbox
This is the lower part.

/tcb/interior hidden (style, no value)

This is a shortcut for \texttt{interior style={draw=none,fill=none}}. Depending on the skin, this option switches off the drawing of the interior. Alternatively, use \texttt{/tcb/interior empty} \texttt{\rightarrow} \texttt{P.146} and/or \texttt{/tcb/interior titled empty} \texttt{\rightarrow} \texttt{P.145}.

egin{verbatim}
\tcbset{frame style={top color=red!20!white, bottom color=red!20!white!75!black}, fonttitle=bfseries,coltitle=black}
\begin{tcolorbox}[enhanced,title=My title, interior hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{verbatim}

My title
This is a tcolorbox
This is the lower part.
/tcb/segmentation_style=(tikz keys) (style, no default)

The \texttt{tikz keys} are used inside the \texttt{tikz} path command for drawing the \textit{segmentation} line of the box.
This option is available if the \texttt{/tcb/segmentation engine} \textsuperscript{+P.143} is set to \texttt{path}. It is \textit{not} available for \texttt{standard}.

\begin{tcolorbox}
\begin{Verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,segmentation style={double=white,draw=blue,double distance=1pt,solid}]
This is a \texttt{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}

My title
This is a \texttt{tcolorbox}.
This is the lower part.

/tcb/segmentation hidden (style, no value)

This is a shortcut for \texttt{segmentation style={draw=none,fill=none}}. Depending on the skin, this option switches off the drawing of the segmentation line. See also \texttt{/tcb/lower separated} \textsuperscript{+P.25} which has the same effect for most skins. Alternatively, use \texttt{/tcb/segmentation empty} \textsuperscript{+P.146}.

\begin{tcolorbox}
\begin{Verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title,enhanced,segmentation hidden]
This is a \texttt{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}

My title
This is a \texttt{tcolorbox}.
This is the lower part.

/tcb/title_style=(tikz keys) (style, no default)

The \texttt{tikz keys} are used inside the \texttt{tikz} path command for drawing the \textit{title area} of the box.
This option is available if the \texttt{/tcb/title engine} \textsuperscript{+P.143} is set to \texttt{path, pathfirst, pathmiddle, or pathlast}. It is \textit{not} available for \texttt{standard}.

\begin{tcolorbox}
\begin{Verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,coltitle=blue!50!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,title style={left color=blue!15!yellow,right color=red!85!black}]
This is a \texttt{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}

My title
This is a \texttt{tcolorbox}.
This is the lower part.

159
/tcb/title style image=(file name)  
(no default, initially unset)

Fills the title area with an external image referenced by \emph{(file name)}. For advanced features like blending of a picture with the background, use \tcb/title style image\textsuperscript{P.159} together with \tcb/title filledimage\textsuperscript{P.271}.

\begin{tcolorbox}[enhanced,title=My title,  
\tcbset{colback=blue!75!white,colframe=blue!75!black,  
\hspace*{1cm} fonttitle=\bfseries}  
\begin{tcblower}  
This is a \textbf{tcolorbox}.  
\end{tcblower}  
\end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title,  
\tcbset{colback=red!75!white,colframe=red!75!black,  
\hspace*{1cm} coltitle=blue!50!black,fonttitle=\bfseries}  
\begin{tcblower}  
This is a \textbf{tcolorbox}.  
\end{tcblower}  
\end{tcolorbox}

/tcb/title style tile=((graphics options))\{(file name)\}  
(no default, initially unset)

Fills the title area with a tile pattern based on an external image referenced by \emph{(file name)}. The \emph{(graphics options)} are given to the underlying \texttt{\includegraphics} command. For advanced features like blending of a picture with the background, use \tcb/title style image\textsuperscript{P.159} together with \tikz/fill tile image\textsuperscript{P.275}.

\begin{tcolorbox}[enhanced,title=My title,  
\tcbset{colback=blue!75!white,colframe=blue!75!black,  
\hspace*{1cm} fonttitle=\bfseries}  
\begin{tcblower}  
This is a \textbf{tcolorbox}.  
\end{tcblower}  
\end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title,  
\tcbset{colback=red!75!white,colframe=red!75!black,  
\hspace*{1cm} coltitle=blue!50!black,fonttitle=\bfseries}  
\begin{tcblower}  
This is a \textbf{tcolorbox}.  
\end{tcblower}  
\end{tcolorbox}

/tcb/title hidden  
(style, no value)

This is a shortcut for \texttt{title style\{draw=none,fill=none\}}. Depending on the skin, this option switches off the drawing of the title background. See also \tcb/title filled\textsuperscript{P.27} for a similar effect. Alternatively, use \tcb/title empty\textsuperscript{P.147}.

\begin{tcolorbox}[enhanced,title=My title,  
\tcbset{colback=blue!75!white,colframe=blue!75!black,  
\hspace*{1cm} fonttitle=\bfseries}  
\begin{tcblower}  
This is a \textbf{tcolorbox}.  
\end{tcblower}  
\end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title,  
\tcbset{colback=red!75!white,colframe=red!75!black,  
\hspace*{1cm} fonttitle=\bfseries}  
\begin{tcblower}  
This is a \textbf{tcolorbox}.  
\end{tcblower}  
\end{tcolorbox}
The \texttt{tikz keys} are used to draw a title rule, i.e. a rule below the optional title. The width of the rule is controlled by \texttt{/tcb/titlerule} \cite{P.36}. It may be set directly to a smaller width to create mixed effects with the standard rule. This option is implemented as an \texttt{/tcb/underlay} \cite{P.204}. Thus, it is not available for \texttt{standard} \cite{P.216} and \texttt{standard jigsaw} \cite{P.217}, but for all other skins, e.g. \texttt{enhanced} \cite{P.218}. As an underlay, this option can be used multiple times and is removed by \texttt{/tcb/no underlay} \cite{P.204}.

\begin{tcolorbox}[enhanced,  
colback=red!5!white,colframe=red!75!black,  
colbacktitle=red!50!yellow,fonttitle=\bfseries,  
title=My title,  
titlerule=1mm,  
titlerule style=yellow ]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced,  
colback=red!5!white,colframe=red!75!black,  
colbacktitle=red!50!yellow,fonttitle=\bfseries,  
title=My title,  
titlerule=1mm,  
titlerule style={yellow,line width=0.5mm} ]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced,  
colback=red!10!white,colframe=red!75!black,  
colbacktitle=red!50!yellow,fonttitle=\bfseries,  
frame hidden,  
title=My title,  
boxrule=0pt,titlerule=1mm,  
titlerule style=red!50!black ]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.

\begin{tcolorbox}[empty,  
coltitle=red!75!black,fonttitle=\bfseries,  
borderline horizontal={0.5mm}{0pt}{red!50!white},  
title=My title,  
titlerule style={red,  
arrows = {Hooks[arc=270]-Hooks[arc=270]}} ]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
The combined TikZ style applied to frame, interior, and title background can be used by authors in customizing code.

/tikz/tcb fill frame (style, no value)
This is a TikZ style which is finally applied to the frame of the box.

\begin{tcolorbox}
\[title=My title\]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tikz/tcb fill interior (style, no value)
This is a TikZ style which is finally applied to the interior of the box.

\begin{tcolorbox}
\[title=My title\]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tikz/tcb fill title (style, no value)
This is a TikZ style which is finally applied to the title area of the box.

\begin{tcolorbox}
\[title=My title\]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
10.2 Boxed Title Option Keys

10.2.1 Boxed Title Placement

The following options place the title text into an own \texttt{tcolorbox}. This boxed title can be customized independently from the main box using /tcb/boxed title style. The placement can be influenced by \texttt{boxtitle options}.

\begin{itemize}
\item \texttt{/tcb/attach boxed title to top left} = \{\texttt{(boxtitle options)}\} (style, default empty)
\end{itemize}

The title is boxed with a \texttt{tcolorbox} and attached to the top left corner of the main box.

\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to top left]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{itemize}
\item \texttt{/tcb/attach boxed title to top text left} = \{\texttt{(boxtitle options)}\} (style, default empty)
\end{itemize}

The title is boxed with a \texttt{tcolorbox} and attached to the top left corner of the main box and shifted to match title text and box text.

\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to top text left]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{itemize}
\item \texttt{/tcb/attach boxed title to top center} = \{\texttt{(boxtitle options)}\} (style, default empty)
\end{itemize}

The title is boxed with a \texttt{tcolorbox} and attached to the top of the main box.

\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to top center]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{itemize}
\item \texttt{/tcb/attach boxed title to top text right} = \{\texttt{(boxtitle options)}\} (style, default empty)
\end{itemize}

The title is boxed with a \texttt{tcolorbox} and attached to the top right corner of the main box and shifted to match title text and box text.

\begin{tcolorbox}[enhanced,title=My title,
align=right,
attach boxed title to top text right]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{itemize}
\item \texttt{/tcb/attach boxed title to top right} = \{\texttt{(boxtitle options)}\} (style, default empty)
\end{itemize}

The title is boxed with a \texttt{tcolorbox} and attached to the top right corner of the main box.

\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to top right]
This is a \texttt{tcolorbox}.
\end{tcolorbox}
The title is boxed with a $\texttt{tcolorbox}$ and attached to the bottom left corner of the main box.

\begin{tcolorbox}[enhanced, title=My title, attach boxed title to bottom left]
This is a $\texttt{tcolorbox}$.
\end{tcolorbox}

My title

This is a $\texttt{tcolorbox}$.

The title is boxed with a $\texttt{tcolorbox}$ and attached to the bottom left corner of the main box and shifted to match title text and box text. Note that this matches the upper part, even, if there is a lower part.

\begin{tcolorbox}[enhanced, title=My title, attach boxed title to bottom text left]
This is a $\texttt{tcolorbox}$.
\end{tcolorbox}

My title

This is a $\texttt{tcolorbox}$.

The title is boxed with a $\texttt{tcolorbox}$ and attached to the bottom of the main box.

\begin{tcolorbox}[enhanced, title=My title, attach boxed title to bottom center]
This is a $\texttt{tcolorbox}$.
\end{tcolorbox}

My title

This is a $\texttt{tcolorbox}$.

The title is boxed with a $\texttt{tcolorbox}$ and attached to the bottom right corner of the main box and shifted to match title text and box text. Note that this matches the upper part, even, if there is a lower part.

\begin{tcolorbox}[enhanced, title=My title, halign=right, attach boxed title to bottom text right]
This is a $\texttt{tcolorbox}$.
\end{tcolorbox}

My title

This is a $\texttt{tcolorbox}$.

The title is boxed with a $\texttt{tcolorbox}$ and attached to the bottom right corner of the main box.

\begin{tcolorbox}[enhanced, title=My title, attach boxed title to bottom right]
This is a $\texttt{tcolorbox}$.
\end{tcolorbox}

My title

This is a $\texttt{tcolorbox}$.
This is a convenient style to mimic a standard title. It uses \texttt{/tcb/attach boxed title to top} \cite{P.163}, \texttt{/tcb/minipage boxed title} \cite{P.172}, and sizes the boxed title to match the base box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top, boxed title style={colframe=red}] This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top*, boxed title style={colframe=red}] This is a \texttt{tcolorbox}.
\end{tcolorbox}

This is a convenient style to produce a standard-like title at the bottom of the box. It uses \texttt{/tcb/attach boxed title to bottom center} \cite{P.164}, \texttt{/tcb/minipage boxed title} \cite{P.172}, and sizes the boxed title to match the base box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom, boxed title style={colframe=red}] This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom*] This is a \texttt{tcolorbox}.
\end{tcolorbox}

In contrast to \texttt{/tcb/attach boxed title to top}, this style uses smaller left and right rules to avoid previewer glitches. Typically, one would not use different colors for the frame as in the example below.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom*, boxed title style={colframe=red}] This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[tile,flip title={sharp corners}, title=My title, colback=red!10, colbacktitle=red!75!black] This is a \texttt{tcolorbox}.
\end{tcolorbox}

This style combines \texttt{/tcb/attach boxed title to bottom*} with \texttt{/tcb/boxed title style} \cite{P.168}. The \texttt{\langle options\rangle} are given to \texttt{/tcb/boxed title style} \cite{P.168}.
10.2.2 Options for the Boxed Title Placement

The ⟨boxtitle options⟩ of the keys described above are shift values. The dimensions of the boxed title are stored into two macros \tcboxedtitleheight and \tcboxedtitlewidth. These macros can be used inside the following ⟨boxtitle options⟩:

/\texttt{tcb/boxtitle/xshift}=⟨\texttt{length}⟩ (no default, initially 0pt)

The boxed title is shifted by ⟨\texttt{length}⟩ in the horizontal direction.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top left={xshift=-2mm}, boxed title style={size=small,colback=blue}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

/\texttt{tcb/boxtitle/yshift}=⟨\texttt{length}⟩ (no default, initially 0pt)

The boxed title is shifted by ⟨\texttt{length}⟩ in the vertical direction.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top center={yshift=-\tcboxedtitleheight/2}, boxed title style={size=small,colback=blue}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

/\texttt{tcb/boxtitle/yshifttext}=⟨\texttt{length}⟩ (no default, initially 0pt)

The text inside the main box is shifted by ⟨\texttt{length}⟩ to give room for e.g. a sunken title.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top center={yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=blue}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

/\texttt{tcb/boxtitle/yshift*}=⟨\texttt{length}⟩ (no default, initially 0pt)

Sets /\texttt{tcb/boxtitle/yshift} and /\texttt{tcb/boxtitle/yshifttext} the same time. /\texttt{tcb/boxtitle/yshifttext} is only set if necessary.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top center={yshift*=-3mm}, boxed title style={size=small,colback=blue}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

The bounding box of the resulting total \texttt{tcolorbox} is adapted automatically to the vertical dimensions of the boxed title. Possible horizontal enlargements are not automatically computed.
10.2.3 Options for the Boxed Title Box

The boxed title options are implemented as an underlay, see Section 10.8 on page 204. Therefore, a boxed title is not drawn, if a skin does not support underlays like `standard` \( \rightarrow \) P.216. Still, the room for the boxed titles gets reserved in these cases.

A Ti\textit{k}Z node \texttt{title} is produced by a boxed title which can be used inside `/tcb/frame code \( \rightarrow \) P.145, /tcb/interior code \( \rightarrow \) P.146, underlays, overlays, and finishes.

A boxed title is almost always the first underlay. The only exceptions are underlays defined by `/tcb/underlay boxed title` \( \rightarrow \) P.205 which are drawn before. Additionally, underlays defined by `/tcb/underlay boxed title` \( \rightarrow \) P.205 are only drawn, if a boxed title is actually set. They are ignored, if there is no boxed title.

\texttt{/tcb/boxed title size}=⟨\textit{size}⟩ (no default, initially \texttt{title})

This setting defines the basic size for the title box. Further settings can be applied using \texttt{/tcb/boxed title style \( \rightarrow \) P.168}. Feasible values for \( ⟨\textit{size}⟩ \) are:
- \texttt{title}: Sets the size according to \texttt{/tcb/size \( \rightarrow \) P.44} = \texttt{title}.
- \texttt{standard}: No size setting. Typically, this is identical to \texttt{/tcb/size \( \rightarrow \) P.44} = \texttt{normal}.
- \texttt{copy}: The size values for a title of the base box are copied for the title box.

\begin{verbatim}
\% \tcbuselibrary{raster}
\begin{tcbraster}[raster columns=3,enhanced,boxrule=0.4pt,
  title=My title,attach boxed title to top center]
  \begin{tcolorbox}[boxed title size=title]
    This is a \textbf{tcolorbox}.
  \end{tcolorbox}
  \begin{tcolorbox}[boxed title size=standard]
    This is a \textbf{tcolorbox}.
  \end{tcolorbox}
  \begin{tcolorbox}[boxed title size=copy]
    This is a \textbf{tcolorbox}.
  \end{tcolorbox}
\end{tcbraster}
\end{verbatim}

My title

This is a \texttt{tcolorbox}.

My title

This is a \texttt{tcolorbox}.

My title

This is a \texttt{tcolorbox}.
By default, a boxed title is dimensioned with `/tcb/size` and inherits the `/tcb/skin` and `/tcb/colframe` of the main box. Also, the `/tcb/colback` is inherited from the main `/tcb/colbacktitle`. Font and color of the title text are set as usual. All other ⟨options⟩ are set by the `/tcb/boxed title style` key. Since a boxed title is set by \texttt{tcb}`, all \texttt{tcolorbox} options are applicable here. If `/tcb/boxed title style` is used several times, the ⟨options⟩ are appended.

```
\begin{tcolorbox}[enhanced,title=My title, fonttitle=\bfseries,coltitle=green!25!black, attach boxed title to top center=\{yshift=-2mm,yshifttext=-1mm\}, boxed title style=\{colframe=green!75!black, colback=yellow!50!green\}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

```
\begin{tcolorbox}[enhanced,title=My title, colframe=red!50!black,colback=red!10!white, arc=1mm,colbacktitle=red!10!white, fonttitle=\bfseries,coltitle=red!50!black, attach boxed title to top text left=\{yshift=-0.50mm\}, boxed title style=\{skin=enhancedfirst jigsaw, size=small,arc=1mm,bottom=-1mm, interior style=\{fill=none, top color=red!30!white, bottom color=red!20!white\}\}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

```
\begin{tcolorbox}[enhanced,title=My title, colframe=blue!50!black,colback=blue!10!white,colbacktitle=blue!5!yellow!10!white, fonttitle=\bfseries,coltitle=black,attach boxed title to top center=\{yshift=-0.25mm-\texttt{tcbxwidth}/2,yshifttext=2mm-\texttt{tcbxwidth}/2\}, boxed title style=\{boxrule=0.5mm, \texttt{tcbfill} \frame\} \{\texttt{tcbfill} \interior\} \{\texttt{tcbfill} \interior\} \{\texttt{tcbfill} \interior\}
\end{tcolorbox}
```

```
\lipsum[2]
\end{tcolorbox}
```


168
My title


My title


The title text content is captured with a horizontal box. Especially, there are no linebreak possible.

```
\newtcolorbox{mybox}[1]{hbox boxed title,
  enhanced,attach boxed title to top center=
  \{yshift=-3mm,yshifttext=-1mm\},
  boxed title style={size=small,colback=red},
  title={#1}}
\begin{mybox}{Short title}
  This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip
\begin{mybox}{This title is not really very short}
  This is a \textbf{tcolorbox}.
\end{mybox}
```

The title text content is captured with a minipage with a width of $\langle length \rangle$. By default, the resulting boxed title is somewhat smaller than the main box.

```
\newtcolorbox{mybox}[1]{minipage boxed title,
  enhanced,attach boxed title to top center=
  \{yshift=-3mm,yshifttext=-1mm\},
  boxed title style={size=small,colback=red},
  center title,title={#1}}
\begin{mybox}{Short title}
  This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip
\begin{mybox}{This title is not really very short}
  This is a \textbf{tcolorbox}.
\end{mybox}
```

The title text content is captured with a minipage with a width of main box width plus $\langle length \rangle$. By default, the resulting boxed title is somewhat smaller than the main box.

```
\newtcolorbox{mybox}[1]{minipage boxed title=-2cm,
  enhanced,attach boxed title to top center=
  \{yshift=-3mm,yshifttext=-1mm\},
  boxed title style={size=small,colback=red},
  center title,title={#1}}
\begin{mybox}{Short title}
  This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip
\begin{mybox}{This title is not really very short}
  This is a \textbf{tcolorbox}.
\end{mybox}
```
The title text content is captured with a TikZ node with given TikZ \texttt{(options)}. The text is centered by default.

\begin{tcolorbox}[mybox]
\textbf{Short title}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[mybox]
\textbf{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

The title text content is captured with a \texttt{varwidth} environment with a width of \texttt{(length)}. This style needs the \texttt{varwidth} package [1] to be loaded manually. By default, the resulting boxed title is somewhat smaller than the main box.

\begin{tcolorbox}[mybox]
\textbf{Short title}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[mybox]
\textbf{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

The title text content is captured with a \texttt{varwidth} environment with a width of main box width plus \texttt{(length)}. This style needs the \texttt{varwidth} package [1] to be loaded manually. By default, the resulting boxed title is somewhat smaller than the main box.

\begin{tcolorbox}[mybox]
\textbf{Short title}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[mybox]
\textbf{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
10.3 Watermark Option Keys

The following watermark options are applicable for all skins which use `tikzpicture` as `/tcb/graphical environment` \(^\text{P.142}\). Therefore, the skin `standard` \(^\text{P.216}\) does not support these watermarks, but all other skins, e.g. `enhanced` \(^\text{P.218}\).

The watermark options rely on the more general overlay options described in Section 4.12 from page 74. Therefore, `watermarks` and `overlays` cannot be used mixed. But a mixture is possible with the `\hook` library, see Section 23.

`\tcb/watermark text = \{text\}` (no default, initially unset)

Writes some \{text\} in the center of the interior region of a `tcolorbox`. This \{text\} is written after the frame and interior are drawn and before the text content is drawn. It is zoomed or stretched according the values of `/tcb/watermark zoom` \(^\text{P.177}\) or `/tcb/watermark stretch` \(^\text{P.179}\).

\begin{tcolorbox}
\[\text{My title, watermark text = My Watermark}\]
\lipsum[1]
\lipsum[2]
\end{tcolorbox}

`\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}`

`\begin{tcolorbox}[enhanced,title=\text{My title, watermark text = My Watermark},\
\lipsum[1]\
\tcblower\
\lipsum[2]\
\end{tcolorbox}`

My title


`\tcb/watermark text on = \{part\} is \{text\}` (no default, initially unset)

This option writes some \{text\} in the center of the interior region of a `tcolorbox` as described for `/tcb/watermark text`. But this is done only for boxes named \{part\} of a break sequence, see `/tcb/breakable` \(^\text{P.390}\).

Feasible values for \{part\} are:

- `broken`: all broken box parts,
- `unbroken`: unbroken boxes only,
- `first`: first parts of a break sequence,
- `middle`: middle parts of a break sequence,
- `last`: last parts of a break sequence,
- `unbroken and first`: unbroken boxes and first parts of a break sequence,
- `middle and last`: middle and last parts of a break sequence,
- `first and middle`: first and middle parts of a break sequence.
Draws an external picture referenced by (file name) in the center of the interior region of a \tcolorbox. The picture is drawn after the frame and interior are drawn and before the text content is drawn. It is zoomed or stretched according the values of /tcb/watermark zoom \textsuperscript{P.177} or /tcb/watermark stretch \textsuperscript{P.179}.

\ \tcbset{colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[enhanced, title=My title, watermark graphics=Basilica_5.png, watermark opacity=0.15]
\lipsum[1-2]
\tcblower
This example uses a public domain picture from\
\url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}
\end{tcolorbox}

My title


This example uses a public domain picture from http://commons.wikimedia.org/wiki/File:Basilica_5.png

\ /tcb/watermark graphics on=(part) is (file name) (no default, initially unset)

This option draws a picture referenced by (file name) in the center of the interior region of a \tcolorbox as described for /tcb/watermark graphics. But this is done only for boxes named (part) of a break sequence, see /tcb/breakable \textsuperscript{P.390}.

Feasible values for (part) are:

- broken: all broken box parts,
- unbroken: unbroken boxes only,
- first: first parts of a break sequence,
- middle: middle parts of a break sequence,
- last: last parts of a break sequence,
- unbroken and first: unbroken boxes and first parts of a break sequence,
- middle and last: middle and last parts of a break sequence.
Draws the given \texttt{tikz} \textit{(graphical code)} in the center of the interior region of a \texttt{tcolorbox}. The code is executed \textit{after} the frame and interior are drawn and \textit{before} the text content is drawn. The result is zoomed or stretched according the values of \texttt{/tcb/watermark zoom} \textsuperscript{P.177} or \texttt{/tcb/watermark stretch} \textsuperscript{P.179}.

\begin{tcolorbox}[enhanced,title=My title,watermark tikz={\draw[\line width=2mm] circle (1cm) node{\fontfamily{ptm}\fontseries{b}\fontsize{20mm}{20mm}\selectfont ?};}]
\lipsum[1]
\lipsum[2]
\end{tcolorbox}

\texttt{/tcb/watermark tikz on=(part) is (graphical code)} \hspace{1em} (no default, initially unset)

This option draws the given \texttt{tikz} \textit{(graphical code)} in the center of the interior region of a \texttt{tcolorbox} as described for \texttt{/tcb/watermark tikz}. But this is done only for boxes named \textit{(part)} of a break sequence, see \texttt{/tcb/breakable} \textsuperscript{P.390}.

Feasible values for \textit{(part)} are:

- \texttt{broken}: all broken box parts,
- \texttt{unbroken}: unbroken boxes only,
- \texttt{first}: first parts of a break sequence,
- \texttt{middle}: middle parts of a break sequence,
- \texttt{last}: last parts of a break sequence,
- \texttt{unbroken and first}: unbroken boxes and first parts of a break sequence,
- \texttt{middle and last}: middle and last parts of a break sequence.

\texttt{/tcb/no watermark} \hspace{1em} (style, no default, initially set)

Removes the watermark if set before. This is an alias for \texttt{/tcb/no overlay} \textsuperscript{P.75}.
/tcb/watermark opacity=(fraction) (no default, initially 1.00)

Sets the opacity value ∈ [0, 1] for a watermark.

\begin{tcolorbox}[title=Opacity 1.00,watermark opacity=1.00]
\lipsum[2]
\end{tcolorbox}
\hfill
\begin{tcolorbox}[title=Opacity 0.50,watermark opacity=0.50]
\lipsum[2]
\end{tcolorbox}

/tcb/watermark zoom=(fraction) (no default, initially 0.75)

Sets the zoom value for a watermark. The zoom respects the aspect ratio. The value 1.0 means to fill the whole box until the watermark touches the frame.

\begin{tcolorbox}[title=Zoom 1.0,watermark zoom=1.0]
\lipsum[2]
\end{tcolorbox}
\hfill
\begin{tcolorbox}[title=Zoom 0.5,watermark zoom=0.5]
\lipsum[2]
\end{tcolorbox}
/tcb/watermark shrink\(=\text{\textit{fraction}}\) (no default, initially unset)

Identically to /tcb/watermark zoom\(^\text{P.177}\), but the watermark never gets enlarged. Thus, the watermark keeps its original size or is shrunk.

/tcb/watermark overzoom\(=\text{\textit{fraction}}\) (no default, initially unset)

Sets the overzoom value for a watermark. The overzoom respects the aspect ratio. The value 1.0 means to fill the whole box until the watermark touches all four sides of the frame.

\begin{tcolorbox}
\begin{verbatim}
\tcbset{enhanced,colback=white,colframe=blue!50!black,fonttitle=\bfseries, watermakr opacity=0.5, watermark graphics=lichtspiel.jpg,nobeforeafter,width=(\linewidth-2mm)/2}
\begin{tcolorbox}[title=Zoom 1.0,watermark zoom=1.0]
\lipsum[1]
\end{tcolorbox}
\begin{tcolorbox}[title=Overzoom 1.0,watermark overzoom=1.0]
\lipsum[1]
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

If a /tcb/watermark overzoom value of 1.0 is used in connection with invisible top and bottom rules which still have a thickness greater than \texttt{Opt}, the space of these invisible rules may not be covered by the watermark. For example, this situation may occur during the breaking of /tcb/enhanced\(^\text{P.218}\) boxes. To avoid this optical glitch, just set /tcb/pad at break\(^\text{P.393}\) to any desired value.
Sets the stretch value for a watermark. The stretch value is applied to width and height in relation to the box dimensions. It does not respect the aspect ratio. The value 1.0 means to fill the whole box.

\begin{tcolorbox}[title=Stretch 1.00,watermark stretch=1.00] \lipsum[2] \end{tcolorbox} \hfill \\begin{tcolorbox}[title=Stretch 0.50,watermark stretch=0.50] \lipsum[2] \end{tcolorbox}

Sets the color for the watermark.

\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries] \lipsum[1] \end{tcolorbox}

/tcb/clip watermark=true/false

Sets the watermark to be clipped to the interior area.

\[\text{tcbset}\{\text{enhanced, colback=white, colframe=blue!50!white, fonttitle=\textbf{\textit{\textserif}}, watermark opacity=0.5, watermark stretch=1.00, arc=3mm, watermark graphics=lichtspiel.jpg}\}

\begin{tcolorbox}[title=Clip (default), clip watermark]
\lipsum[1]
\end{tcolorbox}

\begin{tcolorbox}[title=No clip, clip watermark=false]
\lipsum[1]
\end{tcolorbox}

Clip (default)


No clip

10.4 Clip Environments

The following clip environments are applicable for all skins which use engines of type \texttt{path}, \texttt{pathfirst}, \texttt{pathmiddle}, or \texttt{pathlast}. Especially, the skin \texttt{enhanced}\textsuperscript{P.218} supports \textit{all} of them and \texttt{standard}\textsuperscript{P.216} \textit{none}. The typical area of application is inside overlay code, see Section 4.12 from page 74.

\begin{tcbclipframe}
\langle\text{environment content}\rangle
\end{tcbclipframe}

Defines a \LaTeX\ scope which clips to the frame area path.

\begin{picturebox}[title=My Picture Box]{lichtspiel.jpg}
\lipsum[1]
\end{picturebox}

Defines a Tikz scope which clips to the outside of the frame area path.

\begin{tcbinvclipframe}
\begin{tikzpicture}
% draw two balls
\path [use as bounding box] (0,0.8) rectangle +(0.1,0.1);
\shadedraw [shading=ball] (0,0) circle (1cm);
\shadedraw [ball color=red] (3,-2.2) circle (1cm);
\end{tikzpicture}
\end{tcbinvclipframe}
\begin{tcolorbox}
\begin{tikzpicture}
% draw two balls
\path [use as bounding box] (0,0.8) rectangle +(0.1,0.1);
\shadedraw [shading=ball] (0,0) circle (1cm);
\shadedraw [ball color=red] (3,-2.2) circle (1cm);
\end{tikzpicture}
\end{tcolorbox}

A translucent box

\begin{tcbclipinterior}
\begin{environment content}
\end{tcbclipinterior}
Defines a Tikz scope which clips to the interior area path.
\end{environment content}
\end{tcbclipinterior}

\begin{tcolorbox}[enhanced,title=My Title,
overlay={
\begin{tcbclipinterior}
\draw[red,line width=1cm] (interior.north west)--(interior.south east);
\draw[red,line width=1cm] (interior.south west)--(interior.north east);
\end{tcbclipinterior}}]
\lipsum[1]
\end{tcolorbox}

My Title

\begin{tcbcliptitle}
\begin{environment content}
\end{tcbcliptitle}
\end{environment content}
\end{tcbcliptitle}
Defines a Tikz scope which clips to the title area path.

\begin{tcolorbox}[enhanced,title=My Title,colframe=blue,colback=yellow!10!white,
overlay={
\begin{tcbcliptitle}
\node at (title)
{\includegraphics[width=\linewidth]{lichtspiel.jpg}};
\end{tcbcliptitle}}]
\lipsum[1]
\end{tcolorbox}

My Title
/tcb/clip title=true|false
(default true, initially false)
Sets the title to be clipped to the title area.

\tcbset{enhanced,width=5cm,colframe=red!50!white,coltitle=black, colbacktitle=yellow!50!white}
\begin{tcolorbox}[title=This is a title which is unbreakable and far too long]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=This is a title which is unbreakable and far too long, clip title]
This is a tcolorbox.
\end{tcolorbox}

This is a title which is unbreakable and far too long
This is a tcolorbox.
This is a title which is unbreakable and far too long
This is a tcolorbox.

/tcb/clip upper=true|false
(default true, initially false)
Sets the upper part to be clipped to the interior area.

\newcommand{\mygraphics}[2][]{\%
  \tcbox[enhanced,boxsep=0pt,top=0pt,bottom=0pt,left=0pt,right=0pt,boxrule=0.4pt,drop fuzzy shadow,clip upper, colback=black!75!white,toptitle=2pt,bottomtitle=2pt,nobeforeafter, center title,fonttitle=\small\sffamily,title=\detokenize{#2}]{\includegraphics[width=\the\dimexpr(\linewidth-4mm)/2\relax]{#2}}\%
}\mygraphics[lichtspiel.jpg]\hfill\mygraphics[Basilica_5.png]
The example for \texttt{/tcb/clip upper} \footnote{P.184} sizes the box according to the dimensions of the picture. To do it the other way around, the watermark options provide an easy solution.

\newcommand{\mygraphics}[2][]{%  
\tcbbox[enhanced,capture=minipage,boxsep=0pt,top=0pt,bottom=0pt,left=0pt,  
right=0pt,boxrule=0.4pt,drop fuzzy shadow,nobeforeafter,  
colback=black!75!white,toptitle=2pt,bottomtitle=2pt,  
center title,fonttitle=\texttt{\small\textsf{family}},title=\detokenize{#2},  
width=(\linewidth-4mm)/2,height=6cm,colbacktitle={black},  
watermark zoom=1.0,watermark graphics={#2}]{}}

\mygraphics{lichtspiel.jpg}\hspace{2cm}\mygraphics{Basilica_5.png}

\texttt{/tcb/clip lower=true|false} (default true, initially false)

Sets the lower part to be clipped to the interior area.

\begin{tcblisting}{clip lower}  
Donau\text{-}dampf\text{-}schif\text{-}fahrts\text{-}kap"it"ans\text{-}m"utzenfransen
\end{tcblisting}

\begin{tcblisting}{clip lower}  
Donau\text{-}dampf\text{-}schif\text{-}fahrts\text{-}kap"it"ans\text{-}m"utzenfransen
\end{tcblisting}
10.5 Border Line Option Keys

The following borderline options are applicable for most skins which use \texttt{tikzpicture} as /tcb/graphical environment\textsuperscript{P.142}. Therefore, the skin \texttt{standard}\textsuperscript{P.216} does not support these border lines, but most other skins, e.g. \texttt{enhanced}\textsuperscript{P.218}.

The borderlines are independent from the normal \texttt{tcolorbox} rules. They may be used with or without the /tcb/segmentation engine\textsuperscript{P.143}.

The borderlines are stackable, i.e. several different border lines can be used on the same \texttt{tcolorbox}. They are drawn \textit{after} the box frame and box interior and \textit{before} overlays or watermarks.

\begin{itemize}
  \item Technically, the normal \texttt{tcolorbox} rules result from a TikZ \textit{filling} process. The borderline lines are created by a TikZ \textit{drawing} process. This can be used to apply different effects.
\end{itemize}

\texttt{/tcb/borderline}={⟨\texttt{width}⟩}{⟨\texttt{offset}⟩}{⟨\texttt{options}⟩} \hspace{1cm} \text{(no default, initially unset)}

Adds a new borderline to the stack of border lines. This border line is drawn with the given \texttt{⟨width⟩} and gets an \texttt{⟨offset⟩} computed from the frame outline. A positive \texttt{⟨offset⟩} value moves the borderline inside the \texttt{tcolorbox} and a negative \texttt{⟨offset⟩} value moves it outside without changing the bounding box.

The border line is drawn along a TikZ path with the given TikZ \texttt{⟨options⟩}. Note that the TikZ \texttt{line width} option should not be used here.

The border lines adapt to the rounded corners of the \texttt{tcolorbox}. An inside borderline will switch to sharp corners if necessary, an outside borderline will always be rounded except for \texttt{/tcb/sharp corners}\textsuperscript{P.48}.

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=Rounded corners,fonttitle=\textbf{series},boxsep=5pt,
  arc=8pt,
  borderline={0.5pt}{0pt}{red},
  borderline={0.5pt}{5pt}{blue,dotted},
  borderline={0.5pt}{-5pt}{green} ]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=Sharp corners,fonttitle=\textbf{series},boxsep=5pt,
  arc=8pt,sharp corners=downhill,
  borderline={0.5pt}{0pt}{red},
  borderline={0.5pt}{5pt}{blue,dotted},
  borderline={0.5pt}{-5pt}{green} ]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

Rounded corners

This is a tcolorbox.

Sharp corners

This is a tcolorbox.


My title


/tcb/no borderline (no default, initially set)

Removes all borderlines if set before.

/tcb/show bounding box=(color) (default red, initially unset)

Displays the bounding box borderline of a tcolorbox. Its intended use is debugging and fine tuning. It should not be part of a final document. The optional ⟨color⟩ is the base color for the bounding box borderline.
The following *partial* borderlines act slightly different from the complete borderlines described before. They ignore rounded corner settings, their length is not modified by their \( \langle \text{offset} \rangle \), they ignore skin settings but adapt to breakable boxes.

\begin{tcolorbox}[enhanced, borderline north={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced, borderline south={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced, borderline east={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced, borderline west={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
 Adds a new borderline with the given \( \langle \text{width} \rangle \) to the north and south of the \texttt{tcolorbox}. A positive \( \langle \text{offset} \rangle \) value moves the borderlines inside the \texttt{tcolorbox} and a negative \( \langle \text{offset} \rangle \) value moves them outside without changing the bounding box.

\begin{tcolorbox}\[blanker,top=3mm,bottom=3mm,\]
  \[\text{borderline horizontal}={2\text{pt}}{0\text{pt}}{\text{red}}\]
\end{tcolorbox}

This is a \textbf{tcolorbox}.

Adds a new borderline with the given \( \langle \text{width} \rangle \) to the east and west of the \texttt{tcolorbox}. A positive \( \langle \text{offset} \rangle \) value moves the borderlines inside the \texttt{tcolorbox} and a negative \( \langle \text{offset} \rangle \) value moves them outside without changing the bounding box.

\begin{tcolorbox}\[blanker,left=3mm,right=3mm,\]
  \[\text{borderline vertical}={2\text{pt}}{0\text{pt}}{\text{red}}\]
\end{tcolorbox}

This is a \textbf{tcolorbox}.

10.6 Shadow Option Keys

The following shadow options are applicable for most skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment} \footnote{P.142}. Therefore, the skin \texttt{standard} \footnote{P.216} does not support these shadows, but most other skins, e.g. \texttt{enhanced} \footnote{P.218}.

The shadows are stackable, i.e. several different shadows can be used on the same \texttt{tcolorbox}. They are drawn \textit{before} the box frame is drawn.

\begin{itemize}
\item \texttt{/tcb/no shadow} \hspace{1cm} (no default)
\end{itemize}

Removes all shadows if set before.

10.6.1 Common Shadows and Halos

\begin{itemize}
\item \texttt{/tcb/drop shadow=$\langle color \rangle$} \hspace{1cm} \textbf{(style, default black!50!white)}
\end{itemize}

Adds a new shadow with standard dimensions to the stack of shadows. Optionally, the $\langle color \rangle$ for the shadow can be changed.

\begin{itemize}
\item \texttt{\tcbset{enhanced,colback=red!5!white,}
\hspace{1cm} \texttt{colframe=red!75!black,fonttitle=\bfseries}}
\item \texttt{\begin{tcolorbox}\[drop shadow\]}
\hspace{1cm} \texttt{This is a tcolorbox.}
\item \texttt{\end{tcolorbox}}
\end{itemize}

\begin{itemize}
\item \texttt{\begin{tcolorbox}\[title=Another shadow,}
\hspace{1cm} \texttt{drop shadow=blue]}
\hspace{1cm} \texttt{This is a tcolorbox.}
\item \texttt{\end{tcolorbox}}
\end{itemize}

\begin{itemize}
\item \texttt{\begin{tcolorbox}\[drop fuzzy shadow=$\langle color \rangle$\]}
\hspace{1cm} \texttt{This is a tcolorbox.}
\item \texttt{\begin{tcolorbox}\[title=Another shadow,}
\hspace{1cm} \texttt{drop fuzzy shadow=blue]}
\hspace{1cm} \texttt{This is a tcolorbox.}
\item \texttt{\end{tcolorbox}}
\end{itemize}

\begin{itemize}
\item \texttt{\begin{tcolorbox}\[drop midday shadow=$\langle color \rangle$\]}
\hspace{1cm} \texttt{This is a tcolorbox.}
\item \texttt{\begin{tcolorbox}\[title=Another shadow,}
\hspace{1cm} \texttt{drop midday shadow=blue]}
\hspace{1cm} \texttt{This is a tcolorbox.}
\item \texttt{\end{tcolorbox}}
\end{itemize}
/tcb/drop fuzzy midday shadow = (color) 
(Style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows. Optionally, the (color) for the shadow can be changed.

\tcbset{enhanced, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[drop fuzzy midday shadow]
This is a tcolorbox.
\end{tcolorbox}
Another shadow
This is a tcolorbox.

/tcb/halo = (size) with (color) 
(Style, default 0.9mm with yellow)
Adds a new halo shadow with the given (color) which overlaps the colorbox an all sides by (size).

\tcbset{enhanced, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[title=My own halo, halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}
Another halo
This is a tcolorbox.

/tcb/fuzzy halo = (size) with (color) 
(Style, default 0.9mm with yellow)
Adds a new fuzzy halo shadow with the given (color) which overlaps the colorbox an all sides by (size) plus 0.48mm.

\tcbset{enhanced, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[title=My own halo, fuzzy halo=2mm with red!50!white, fuzzy halo=1mm with white]
This is a tcolorbox.
\end{tcolorbox}
Another halo
This is a tcolorbox.

\begin{tcolorbox}[blank, enhanced jigsaw, boxsep=2pt, arc=2pt, fuzzy halo=2mm with red!50!white, fuzzy halo=1mm with white]
\lipsum[1]
\end{tcolorbox}
For all following shadows, the optionally given \texttt{⟨color⟩} for the shadow can be changed equivalent to the preceding examples.

/tcb/drop shadow southeast=⟨color⟩ \hspace{1cm} \text{(style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows. This shadow is identical to \texttt{/tcb/drop shadow} \hspace{1cm} \text{→ P.191}.

\begin{tcolorbox}
\[\text{drop shadow southeast,}
\quad \text{enhanced, colback=red!50!white, colframe=red!75!black}\]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop shadow south=⟨color⟩ \hspace{1cm} \text{(style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows. This shadow is identical to \texttt{/tcb/drop midday shadow} \hspace{1cm} \text{→ P.191}.

\begin{tcolorbox}
\[\text{drop shadow south,}
\quad \text{enhanced, colback=red!50!white, colframe=red!75!black}\]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop shadow southwest=⟨color⟩ \hspace{1cm} \text{(style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\[\text{drop shadow southwest,}
\quad \text{enhanced, colback=red!50!white, colframe=red!75!black}\]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop shadow west=⟨color⟩ \hspace{1cm} \text{(style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\[\text{drop shadow west,}
\quad \text{enhanced, colback=red!50!white, colframe=red!75!black}\]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop shadow northwest=⟨color⟩ \hspace{1cm} \text{(style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\[\text{drop shadow northwest,}
\quad \text{enhanced, colback=red!50!white, colframe=red!75!black}\]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop shadow north=⟨color⟩ \hspace{1cm} \text{(style, default black!50!white)}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\[\text{drop shadow north,}
\quad \text{enhanced, colback=red!50!white, colframe=red!75!black}\]
This is a tcolorbox.
\end{tcolorbox}
/tcb/drop shadow northeast\[=\text{(color)}\] (style, default black!50!white)

Adds a new shadow with standard dimensions to the stack of shadows.

```
\begin{tcolorbox}[drop shadow northeast,
  enhanced,colback=red!5!white,colframe=red!75!black]
  This is a tcolorbox.
\end{tcolorbox}
```

This is a tcolorbox.

/tcb/drop shadow east\[=\text{(color)}\] (style, default black!50!white)

Adds a new shadow with standard dimensions to the stack of shadows.

```
\begin{tcolorbox}[drop shadow east,
  enhanced,colback=red!5!white,colframe=red!75!black]
  This is a tcolorbox.
\end{tcolorbox}
```

This is a tcolorbox.

/tcb/drop fuzzy shadow southeast\[=\text{(color)}\] (style, default black!50!white)

Adds a new fuzzy shadow with standard dimensions to the stack of shadows. This shadow is identical to /tcb/drop fuzzy shadow \[\rightarrow\] P.191.

```
\begin{tcolorbox}[drop fuzzy shadow southeast,
  enhanced,colback=red!5!white,colframe=red!75!black]
  This is a tcolorbox.
\end{tcolorbox}
```

This is a tcolorbox.

/tcb/drop fuzzy shadow south\[=\text{(color)}\] (style, default black!50!white)

Adds a new fuzzy shadow with standard dimensions to the stack of shadows. This shadow is identical to /tcb/drop fuzzy midday shadow \[\rightarrow\] P.192.

```
\begin{tcolorbox}[drop fuzzy shadow south,
  enhanced,colback=red!5!white,colframe=red!75!black]
  This is a tcolorbox.
\end{tcolorbox}
```

This is a tcolorbox.

/tcb/drop fuzzy shadow southwest\[=\text{(color)}\] (style, default black!50!white)

Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

```
\begin{tcolorbox}[drop fuzzy shadow southwest,
  enhanced,colback=red!5!white,colframe=red!75!black]
  This is a tcolorbox.
\end{tcolorbox}
```

This is a tcolorbox.

/tcb/drop fuzzy shadow west\[=\text{(color)}\] (style, default black!50!white)

Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

```
\begin{tcolorbox}[drop fuzzy shadow west,
  enhanced,colback=red!5!white,colframe=red!75!black]
  This is a tcolorbox.
\end{tcolorbox}
```

This is a tcolorbox.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/tcb/drop fuzzy shadow northwest</code></td>
<td>Adds a new fuzzy shadow with standard dimensions to the stack of shadows.</td>
</tr>
<tr>
<td><code>/tcb/drop fuzzy shadow north</code></td>
<td>Adds a new fuzzy shadow with standard dimensions to the stack of shadows.</td>
</tr>
<tr>
<td><code>/tcb/drop fuzzy shadow northeast</code></td>
<td>Adds a new fuzzy shadow with standard dimensions to the stack of shadows.</td>
</tr>
<tr>
<td><code>/tcb/drop fuzzy shadow east</code></td>
<td>Adds a new fuzzy shadow with standard dimensions to the stack of shadows.</td>
</tr>
</tbody>
</table>

Example usage:

```
\begin{tcolorbox}[drop fuzzy shadow northwest, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
```

This is a tcolorbox.
10.6.2 Lifted Shadows

/tcb/drop lifted shadow=(color)

Adds a new lifted shadow with standard dimensions to the stack of shadows. Optionally, the (color) for the shadow can be changed.

```
\tcset{enhanced, colback=red!5!white, boxrule=0.4pt, sharp corners, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[drop lifted shadow]
This is a tcolorbox.
\end{tcolorbox}
```

```
\begin{tcolorbox}[title=Another shadow, drop lifted shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
```

/tcb/drop small lifted shadow=(color)

Adds a new small lifted shadow with standard dimensions to the stack of shadows. Optionally, the (color) for the shadow can be changed.

```
\tcset{enhanced, colback=red!5!white, boxrule=0.4pt, sharp corners, colframe=red!75!black, fonttitle=\bfseries}
\tcbx[drop small lifted shadow, size=fbox]
{This is a tcolorbox.}
\par \bigskip
\begin{tcolorbox}[title=Another shadow, drop small lifted shadow=black]
This is a tcolorbox.
\end{tcolorbox}
```

/tcb/drop large lifted shadow=(color)

Adds a new large lifted shadow with standard dimensions to the stack of shadows. Optionally, the (color) for the shadow can be changed.

```
\tcset{enhanced, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[drop large lifted shadow]
This is a tcolorbox.
\end{tcolorbox}
```

```
\begin{tcolorbox}[title=Another shadow, drop large lifted shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
```
10.6.3 Generic Shadows

/\texttt{tcb/shadow}=\langle xshift\rangle\{\langle yshift\rangle\}\{\langle offset\rangle\}\{\langle options\rangle\} (no default)

Adds a new shadow to the stack of shadows. This shadow follows the outline of the \texttt{tcolorbox} but is shifted by \langle xshift\rangle and \langle yshift\rangle. The \langle offset\rangle value is a distance value from the frame outline. A positive \langle offset\rangle value shrinks the shadow and a negative \langle offset\rangle value enlarges the shadow. The shadow is filled along a Ti\kern.5ex Z path with the given Ti\kern.5ex Z \langle options\rangle.

The shadows adapt to the rounded corners of the \texttt{tcolorbox}. An shrunked shadow will switch to sharp corners if necessary, an enlarged shadow may become more rounded depending on several factors. But /\texttt{tcb/sharp corners}\P.48 have sharp shadows.

Shadows are not considered for the bounding box computation by default. Large shadows may be overlaped by the following content. But, the bounding box can be adapted if necessary.

\begin{tcolorbox}
\textbf{My own shadow,}
shadow={2mm}{-1mm}{2mm}{black!50!white}
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
\textbf{Another shadow,}
shadow={-1mm}{-2mm}{0mm}{fill=blue, opacity=0.5}
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
\textbf{Double shadow,}
\begin{itemize}
\item shadow={-1.5mm}{-1.5mm}{0mm}{fill=blue, opacity=0.25},
\item shadow={1.5mm}{-1.5mm}{0mm}{fill=red, opacity=0.25}
\end{itemize}
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
\textbf{Far shadow,}
shadow={5.5mm}{-3.5mm}{2mm}{fill=black, opacity=0.25}
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
\textbf{Halo shadow,}
\begin{itemize}
\item shadow={0mm}{0mm}{-1.5mm}
\item \{fill=yellow!75!red, opacity=0.5\}
\end{itemize}
This is a \texttt{tcolorbox}.
\end{tcolorbox}
/tcb/fuzzy shadow={⟨xshift⟩}{⟨yshift⟩}{⟨offset⟩}{⟨step⟩}{⟨options⟩} (no default)

Adds a new fuzzy shadow to the stack of shadows. Actually, this option adds several shadows which appear like a shadow with a fuzzy border. This fuzzy shadow follows the outline of the \texttt{tcolorbox} but is shifted by \texttt{⟨xshift⟩} and \texttt{⟨yshift⟩}. The \texttt{⟨offset⟩} value is a distance value from the frame outline. A positive \texttt{⟨offset⟩} value shrinks the shadow and a negative \texttt{⟨offset⟩} value enlarges the shadow. The \{⟨step⟩\} value describes a shrink offset used for the combination of the partial shadows. The shadow is filled along a Ti\LaTeX{} path with the given Ti\LaTeX{} \texttt{⟨options⟩} but any \texttt{opacity} value will be ignored.

\begin{tcolorbox}
\texttt{tcbset\{enhanced,\colback=red!5!white,\
colframe=red!75!black,\fonttitle=\bfseries\}}
\begin{tcbox}[title=My own shadow,\fuzzy shadow={2mm}{-1mm}{0mm}{0.1mm}\%\{black!50!white\}]
This is a tcolorbox.
\end{tcbox}
\par\bigskip
\begin{tcbox}[title=Another shadow,\fuzzy shadow={-1mm}{-2mm}{0mm}{0.2mm}\%\{fill=blue\}]
This is a tcolorbox.
\end{tcbox}
\par\bigskip
\begin{tcbox}[title=Double shadow,\fuzzy shadow={-1.5mm}{-1.5mm}{0mm}{0.1mm}\%,\fuzzy shadow={1.5mm}{-1.5mm}{0mm}{0.1mm}\%\{blue\},\fuzzy shadow={1.5mm}{-1.5mm}{0mm}{0.1mm}\%\{red\}]
This is a tcolorbox.
\end{tcbox}
\par\bigskip
\begin{tcbox}[title=Far shadow,\fuzzy shadow={5.5mm}{-3.5mm}{0mm}{0.3mm}\%\{black\}]
This is a tcolorbox.
\end{tcbox}
\par\bigskip
\begin{tcbox}[title=Glow shadow,\fuzzy shadow={0mm}{0mm}{-1.5mm}{0.15mm}\%\{yellow!75!red\}]
This is a tcolorbox.
\end{tcbox}
\par\bigskip
\begin{tcbox}[title=A multi shadow box]
\texttt{\newtcolorbox\{mybox\}[1]\{\\{enhanced,\
fuzzy shadow={1.0mm}{-1.0mm}{0.12mm}{0mm}\{blue!50!white\},\
fuzzy shadow={-1.0mm}{-1.0mm}{0.12mm}{0mm}\{red!50!white\},\
fuzzy shadow={-1.0mm}{1.0mm}{0.12mm}{0mm}\{green!50!white\},\
fuzzy shadow={1.0mm}{1.0mm}{0.12mm}{0mm}\{yellow!50!white\},\#1\}
\begin{mybox}[title=A multi shadow box]
This is a tcolorbox.
\end{mybox}
\end{tcbox}
If set to `true`, the shadow drawing algorithm tries to do a somewhat smart calculation of the arc for the shadow. The result is pleasing for typical boxes with rounded corners, but gives strange results for circular boxes.

\begin{tcolorbox}[drop shadow]
Smart shadow arc (arguably better than normal)
\end{tcolorbox}

\begin{tcolorbox}[smart shadow arc=false, drop shadow]
Normal shadow arc
\end{tcolorbox}

\begin{tcolorbox}[circular arc, drop shadow]
Smart shadow arc (worse than normal)
\end{tcolorbox}

\begin{tcolorbox}[circular arc, smart shadow arc=false, drop shadow]
Normal shadow arc
\end{tcolorbox}

/\texttt{tcb/lifted shadow}={\langle xshift\rangle}{\langle yshift\rangle}{\langle bend\rangle}{\langle step\rangle}{\langle options\rangle} \hspace{1em} \text{(no default)}

Adds a new lifted shadow to the stack of shadows. Actually, this option adds several shadows which appear like a shadow with a fuzzy border. This lifted shadow follows the outline of the \texttt{tcolorbox} but is shifted by \langle xshift\rangle and \langle yshift\rangle on the lower left corner and by \langle xshift\rangle and \langle yshift\rangle on the lower right corner. Additionally, there is a \langle bend\rangle in the middle. The \langle step\rangle value describes a shrink offset used for the combination of the partial shadows. The shadow is filled along a TikZ path with the given TikZ \langle options\rangle but any \texttt{opacity} value will be ignored.
10.6.4 TikZ Shadows

Alternativ to the package shadow options described before, shadows from the «Shadows Library» of TikZ can be used. Such shadows can be added directly to the frame path using \texttt{/tcb/frame style}.^\textsuperscript{P.156}

\begin{tcolorbox}
\begin{tikzlibrary}{shadows}
\begin{tcolorbox}[enhanced, colback=red!5!white,colframe=red!75!black, frame style={drop shadow} ]
This is a tcolorbox.
\end{tcolorbox}
\end{tikzlibrary}
\end{tcolorbox}

\begin{tcolorbox}
\begin{tikzlibrary}{shadows}
\begin{tcolorbox}[enhanced,height=3cm, colback=red!5!white,colframe=red!75!black, halign=center,valign=center, frame style={circular drop shadow} ]
This is a tcolorbox.
\end{tcolorbox}
\end{tikzlibrary}
\end{tcolorbox}

\begin{tcolorbox}
\begin{tikzlibrary}{shadows}
\begin{tcolorbox}[enhanced,width=2.5cm, square,circular arc, halign=center,valign=center, colback=red!5!white,colframe=red!75!black, frame style={circular glow={fill=red}} ]
tcolorbox\end{tcolorbox}
\end{tikzlibrary}
\end{tcolorbox}
10.7 TikZ Picture Option Keys

The following general options are applicable for skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment} \textsuperscript{P.142}. Therefore, the skin \texttt{standard} \textsuperscript{P.216} does not support these options, but most other skins, e.g. \texttt{enhanced} \textsuperscript{P.218}.

\texttt{/tcb/tikz=\{tikz option list\}} (no default, initially empty)

Adds the given \texttt{\{tikz option list\}} to the main \texttt{tikzpicture} environment used to draw the color box, see \textsuperscript{[22]}. If this option is applied a second time, the new \texttt{\{tikz option list\}} is appended to the current option list.

\begin{verbatim}
\tcbset{enhanced,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=Transparent box,tikz={opacity=0.5,transparency group}]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
\tcbset{enhanced,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,fontupper=\bfseries\Huge,halign title=center,halign=center}
\begin{tcolorbox}[title=Rotated box,tikz={rotate=30}]
Sold!
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/tikz reset} (initially set)

Removes all options given by \texttt{/tcb/tikz}.

\texttt{/tcb/at begin tikz=\{tikz code\}} (no default, initially empty)

The given \texttt{\{tikz code\}} is executed at the beginning of the \texttt{tikzpicture} environment after the TikZ option \texttt{execute at begin picture} was applied. If this option is applied a second time, the new \texttt{\{tikz code\}} is appended to the current code.

\texttt{/tcb/at begin tikz reset} (initially set)

Removes all code given by \texttt{/tcb/at begin tikz}.

\texttt{/tcb/at end tikz=\{tikz code\}} (no default, initially empty)

The given \texttt{\{tikz code\}} is executed at the ending of the \texttt{tikzpicture} environment before the TikZ option \texttt{execute at end picture} was applied. If this option is applied a second time, the new \texttt{\{tikz code\}} is appended to the current code.

\texttt{/tcb/at end tikz reset} (initially set)

Removes all code given by \texttt{/tcb/at end tikz}.
/tcb/rotate=⟨angle⟩  (no default, initially unset)
Rotates the \tcolorbox by the given ⟨angle⟩. Note that this is a TikZ coordinate transfor-
mation i.e. not all graphical elements like shadings will really be rotated.

\begin{tcolorbox}[title=Rotated box,rotate=30]
This is a tcolorbox.
\end{tcolorbox}

/tcb/scale=⟨fraction⟩  (no default, initially unset)
Scales the \tcolorbox by the given ⟨fraction⟩. Note that this is a TikZ coordinate transfor-
mation i.e. not all graphical elements like line widths will really be scaled.

\begin{tcolorbox}[title=Scaled box,scale=0.5]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=Scaled box,scale=1.25]
This is a tcolorbox.
\end{tcolorbox}

/tcb/remember  (style, initially unset)
Shortcut for tikz={remember picture}. This allows one to reference nodes in other TikZ
pictures.

\begin{tcolorbox}[enhanced,remember,colback=red!5!white,colframe=red!75!black,
fonttitle=\bfseries,title=The four corners of a paper,
overlay={\draw[red!50!white,line width=1mm,opacity=0.5,shorten >=3mm] (frame.north west) edge[->] (current page.north west)
(frame.north east) edge[->] (current page.north east)
(frame.south west) edge[->] (current page.south west)
(frame.south east) edge[->] (current page.south east);}]
This is a tcolorbox.
\end{tcolorbox}
The `frame` node will be remembered by the given `<name>` to be referenced in other TikZ pictures.

```
\usepackage{tikz}
\begin{tikzpicture}
\node[\textit{First Box}](one) at (0,0) {This is a test.};
\node[\textit{Second Box}](two) at (2,0) {This is a test.};
\node[\textit{Third Box}](three) at (4,0) {This is a test.};
\node[\textit{Fourth Box}](four) at (6,0) {This is a test.};
\draw[-latex] (one.east) to[bend right] node[above] {A} (two.west);
\draw[-latex] (two.east) to[bend left] node[above] {B} (three.west);
\draw[-latex] (three.east) to[bend left=90] node[right] {C} (four.east);
\draw[-latex] (four.west) to[bend left=90] node[left] {D} (one.west);
\end{tikzpicture}
```
10.8 Underlay Option Keys

Underlays are quite similar to overlays described in Section 4.12 on page 74. Underlays are drawn after the frame and interior are drawn and before overlays and the text content is drawn; see Section 9.4 on page 149 for the general drawing scheme.

The differences between underlays and overlays are:

- Underlays are not applicable for the skins standard→P.216 and standard jigsaw→P.217, whereas overlays are applicable also for these skins. The skin spartan→P.261 supports underlays but no overlays.

  ![If an underlay is used with the standard→P.216 skin, it is silently ignored.]

- Underlays are stackable, i.e. several different underlays can be used on the same tcolorbox. Overlays are not stackable by default (but with some help of the library LIB hooks).

- Boxed titles are implemented with underlays (Section 10.2 on page 163), watermarks are implemented with overlays (Section 10.3 on page 174).

\[\text{/tcb/underlay}=(\text{graphical code})\] (no default, initially unset)

Adds \textit{graphical code} to the box drawing process. This \textit{graphical code} is drawn after the frame and interior and before the text content.

\begin{tcolorbox}[title=My box,watermark text=My Watermark]
\lipsum[2]
\end{tcolorbox}

My box


\[\text{/tcb/no underlay}\] (style, no default, initially set)

Removes the underlay if set before.
/tcb/underlay broken = (graphical code) (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 and is broken actually, then the (graphical code) is added to the box drawing process. /tcb/underlay → P.204 overwrites this key.

/tcb/underlay unbroken = (graphical code) (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 but is not broken actually or if the box is set to be /tcb/unbreakable → P.391, then the (graphical code) is added to the box drawing process. /tcb/underlay → P.204 overwrites this key.

/tcb/no underlay unbroken (style, no default, initially set)

Removes the unbroken underlay if set before.

/tcb/underlay first = (graphical code) (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 and is broken actually, then the (graphical code) is added to the box drawing process for the first part of the break sequence. /tcb/underlay → P.204 overwrites this key.

/tcb/no underlay first (style, no default, initially set)

Removes the first underlay if set before.

/tcb/underlay middle = (graphical code) (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 and is broken actually, then the (graphical code) is added to the box drawing process for the middle parts (if any) of the break sequence. /tcb/underlay → P.204 overwrites this key.

/tcb/no underlay middle (style, no default, initially set)

Removes the middle underlay if set before.

/tcb/underlay last = (graphical code) (no default, initially unset)

If the box is set to be /tcb/breakable → P.390 and is broken actually, then the (graphical code) is added to the box drawing process for the last part of the break sequence. /tcb/underlay → P.204 overwrites this key.

/tcb/no underlay last (style, no default, initially set)

Removes the last underlay if set before.

/tcb/underlay boxed title = (graphical code) (no default, initially unset)

If the box has a boxed title, see Section 10.2 on page 163, then the (graphical code) is added to the box drawing process before the boxed title is drawn.

/tcb/no underlay boxed title (style, no default, initially set)

Removes the boxed title underlay if set before.

/tcb/underlay unbroken and first = (graphical code) (no default, initially unset)

This is an abbreviation for setting /tcb/underlay unbroken and /tcb/underlay first together. /tcb/underlay → P.204 overwrites this key.

/tcb/underlay middle and last = (graphical code) (no default, initially unset)

This is an abbreviation for setting /tcb/underlay middle and /tcb/underlay last together. /tcb/underlay → P.204 overwrites this key.

/tcb/underlay unbroken and last = (graphical code) (no default, initially unset)

This is an abbreviation for setting /tcb/underlay unbroken and /tcb/underlay last together. /tcb/underlay → P.204 overwrites this key.

/tcb/underlay first and middle = (graphical code) (no default, initially unset)

This is an abbreviation for setting /tcb/underlay first and /tcb/underlay middle together. /tcb/underlay → P.204 overwrites this key.
10.9 Finish Option Keys

Finishes are quite similar to underlays described in Section 10.8 on page 204 and overlays described in Section 4.12 on page 74. Finishes are drawn after the text content is drawn; see Section 9.4 on page 149 for the general drawing scheme. Therefore, a finish will reduce the readability of the text content.

Finishes are intended for special effects like highlights or glosses or text over text.

- Finishes are only applicable for the skins enhanced \textsuperscript{P.218}, empty \textsuperscript{P.251}, freelance \textsuperscript{P.264}, bicolor \textsuperscript{P.230}, beamer \textsuperscript{P.244}, and widget \textsuperscript{P.248}.

\begin{itemize}
\item If a finish is used with the standard \textsuperscript{P.216} skin, it is silently ignored.
\item Finishes are stackable, i.e. several different finishes can be used on the same \texttt{tcolorbox}.
\end{itemize}

\texttt{/tcb/finish=⟨\textit{graphical code}⟩} (no default, initially unset)

Adds \textit{⟨graphical code⟩} to the box drawing process. This \textit{⟨graphical code⟩} is drawn after the text content.

\begin{verbatim}
\newtcolorbox{mybox}[1][]{enhanced,colback=red!5!white,
  colbacktitle=red!85!black!50!white,colframe=red!75!black,fonttitle=\bfseries,
  finish={\begin{tcbclipframe}
  \path[bottom color=black,top color=black!50!white,opacity=0.1]
  (frame.south west) -- (frame.south east) -- (frame.north east) -- cycle;
  \path[top color=white,bottom color=black!50!white,opacity=0.1]
  (frame.south west) -- (frame.north east) -- (frame.north west) -- cycle;
  \end{tcbclipframe}},#1}
\begin{mybox}[title=My box]
\lipsum[2]
\end{mybox}
\end{verbatim}

\begin{verbatim}
\newtcolorbox{mybox}[1][]{enhanced,colback=red!5!white,
  colbacktitle=red!85!black!50!white,colframe=red!75!black,fonttitle=\bfseries,
  finish={\begin{tcbclipframe}
  \node[draft,fill=white,fill opacity=0.85,inner sep=5mm,
  rounded corners] at (frame.center) {\Huge\bfseries Finish!};}
  \end{tcbclipframe}},#1}
\begin{mybox}[title=My box]
\lipsum[2]
\end{mybox}
\end{verbatim}

My box


Finish!
/tcb/no finish  (style, no default, initially set)
Removes the finish if set before.

/tcb/finish broken=⟨graphical code⟩  (no default, initially unset)
If the box is set to be /tcb/breakable\^P.390 and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process. /tcb/finish \^P.206 overwrites this key.

/tcb/finish unbroken=⟨graphical code⟩  (no default, initially unset)
If the box is set to be /tcb/breakable\^P.390 but is not broken actually or if the box is set to be /tcb/unbreakable\^P.391, then the ⟨graphical code⟩ is added to the box drawing process. /tcb/finish \^P.206 overwrites this key.

/tcb/no finish unbroken  (style, no default, initially set)
Removes the unbroken finish if set before.

/tcb/finish first=⟨graphical code⟩  (no default, initially unset)
If the box is set to be /tcb/breakable\^P.390 and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the first part of the break sequence. /tcb/finish \^P.206 overwrites this key.

/tcb/no finish first  (style, no default, initially set)
Removes the first finish if set before.

/tcb/finish middle=⟨graphical code⟩  (no default, initially unset)
If the box is set to be /tcb/breakable\^P.390 and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the middle parts (if any) of the break sequence. /tcb/finish \^P.206 overwrites this key.

/tcb/no finish middle  (style, no default, initially set)
Removes the middle finish if set before.

/tcb/finish last=⟨graphical code⟩  (no default, initially unset)
If the box is set to be /tcb/breakable\^P.390 and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the last part of the break sequence. /tcb/finish \^P.206 overwrites this key.

/tcb/no finish last  (style, no default, initially set)
Removes the last finish if set before.

/tcb/finish unbroken and first=⟨graphical code⟩  (no default, initially unset)
This is an abbreviation for setting /tcb/finish unbroken and /tcb/finish first together. /tcb/finish \^P.206 overwrites this key.

/tcb/finish middle and last=⟨graphical code⟩  (no default, initially unset)
This is an abbreviation for setting /tcb/finish middle and /tcb/finish last together. /tcb/finish \^P.206 overwrites this key.

/tcb/finish unbroken and last=⟨graphical code⟩  (no default, initially unset)
This is an abbreviation for setting /tcb/finish unbroken and /tcb/finish last together. /tcb/finish \^P.206 overwrites this key.

/tcb/finish first and middle=⟨graphical code⟩  (no default, initially unset)
This is an abbreviation for setting /tcb/finish first and /tcb/finish middle together. /tcb/finish \^P.206 overwrites this key.
10.10 Hyper Option Keys

All options of this section need the package \texttt{hyperref} \cite{hyperref} to be loaded separately. All these options are implemented as \texttt{/tcb/finish} \cite{tcb/finish} and can be disabled by \texttt{/tcb/no finish} \cite{tcb/no finish}.

\begin{itemize}
  \item If the package \texttt{hyperref} \cite{hyperref} is not loaded or if the standard skin is used, all hyper option are silently ignored.
\end{itemize}

\texttt{/tcb/hyperref}=\texttt{(marker)} \hspace{1cm} \text{(no default, initially unset)}

The whole frame of a \tcolorbox is made an active hyperlink for a \texttt{(marker)} which was given by \texttt{\label} or \texttt{/tcb/label} \cite{tcb/label} or \texttt{/tcb/phantomlabel} \cite{tcb/phantomlabel}. Such, the \tcolorbox is made a clickable button (depending on the previewer).

\begin{itemize}
  \item \usepackage{hyperref}
\end{itemize}

\texttt{/tcb/hyperref interior}=\texttt{(marker)} \hspace{1cm} \text{(no default, initially unset)}

Identical to \texttt{/tcb/hyperref}, but only the interior of a \tcolorbox is made a hyperlink (without frame and title).

\texttt{/tcb/hyperref title}=\texttt{(marker)} \hspace{1cm} \text{(no default, initially unset)}

Identical to \texttt{/tcb/hyperref}, but only the title of a \tcolorbox is made a hyperlink.

\texttt{/tcb/hyperref node}=\texttt{(marker)}\texttt{\{node\}} \hspace{1cm} \text{(no default, initially unset)}

Identical to \texttt{/tcb/hyperref}, but only the given Ti\textsc{k}Z \texttt{(node)} is made a hyperlink. This \texttt{(node)} may be \texttt{frame}, \texttt{interior}, \texttt{title}, or any other named node used for drawing the \tcolorbox. The \texttt{(node)} may be defined inside \texttt{/tcb/underlay} \cite{tcb/underlay}, \texttt{/tcb/overlay} \cite{tcb/overlay} or \texttt{/tcb/finish} \cite{tcb/finish}. If the later is used, define the node before \texttt{/tcb/hyperref node} is applied.

\begin{itemize}
  \item \usepackage{hyperref}
\end{itemize}

\texttt{/tcb/hyperlink}=\texttt{(marker)} \hspace{1cm} \text{(no default, initially unset)}

The whole frame of a \tcolorbox is make an active hyperlink for a \texttt{(marker)} which was given by \texttt{\hypertarget} or \texttt{/tcb/hypertarget} \cite{tcb/hypertarget}. Such, the \tcolorbox is made a clickable button (depending on the previewer).
\begin{tcolorbox}[enhanced,colback=red!50, hyperurl=https://www.ctan.org/pkg/tcolorbox]
View CTAN with a browser.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,colback=green!50, hyperurl*={page=3,pdfnewwindow=true}]
Open example file on Page~3.
\end{tcolorbox}
10.11 Jigsaw Skin Variants

As described in Section 9.1 on page 141, a \texttt{tcolorbox} is drawn by up to four \textit{engines}. Typically, the \textit{frame} engine fills the complete box area with color and the other engines fill certain areas with other colors. Finally, only the area which you see as \textit{frame} of the box will display the frame color. For most applications, this is a good approach.

For certain boxes, a more delicate procedure is needed. E.g., if the box should be translucent, an already painted area cannot be made unpainted. Therefore, more elaborate frame engines saw holes into the frame where the interior area and optionally the title area will be painted. The resulting skins are called \textit{jigsaw} skins. For \textit{standard} \textsuperscript{P.216}, \textit{enhanced} \textsuperscript{P.218}, and \textit{bicolor} \textsuperscript{P.230}, there are variants called \textit{standard jigsaw} \textsuperscript{P.217}, \textit{enhanced jigsaw} \textsuperscript{P.224}, and \textit{bicolor jigsaw} \textsuperscript{P.236}.

\begin{tikzpicture}
\path[use as bounding box] (0,0.8) rectangle +(0.1,0.1);
\shadedraw [shading=ball] (0,0) circle (1cm);
\shadedraw [ball color=red] (3,-2.2) circle (1cm);
\end{tikzpicture}

\begin{tcolorbox}[title=A normal box]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[title=A translucent jigsaw box, enhanced jigsaw,opacityback=0.35]
\lipsum[2]
\end{tcolorbox}

A normal box


A translucent jigsaw box

\begin{tcolorbox}[title=A normal box with hidden interior and title]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[enhanced jigsaw,
    title=A jigsaw box with hidden interior and title]
This is a tcolorbox.
\end{tcolorbox}

\begin{mybox}
\lipsum[2]
\end{mybox}

10.12 Draft Mode

To reduce the compilation time while drafting a document, the draft mode can be applied. Basically, it changes all skins to spartan \textsuperscript{P.261} and sets the /tcb/fit algorithm \textsuperscript{P.448} to squeeze. Especially, when fuzzy shadows are used, the speedup will be considerable high.

It is strongly recommended that the draft mode is not used for the final document. Use spartan \textsuperscript{P.261} directly, if you want to stay with it. The draft mode implementation may change in future.

Normally, switching to the draft mode should not alter the geometry of your document. Since overlays are deactivated, any code placed there (e.g. counter changes) is not executed anymore! Also, /tcb/remember as \textsuperscript{P.203} will not have any effect. You may exclude critical code with \texttt{tcbinterruptdraftmode / tcbcontinuedraftmode} from converting to draft mode.

\begin{tcbstartdraftmode}
Any following \texttt{tcolorbox} code is put into draft mode. All skin settings are overruled with spartan \textsuperscript{P.261}. Overlays, watermarks, shadows, borderlines, and rounded corners are deactivated for all \texttt{tcolorbox} layers.
\end{tcbstartdraftmode}

\begin{tcbstopdraftmode}
The draft mode is deactivated for the following code.
\end{tcbstopdraftmode}

\begin{tcbinterruptdraftmode}
If the compilation is in draft mode, the draft mode is deactivated until a following \texttt{tcbcontinuedraftmode} is detected.
If the compilation is not in draft mode, nothing happens and a following \texttt{tcbcontinuedraftmode} will not start the draft mode.
\end{tcbinterruptdraftmode}

The pair \texttt{tcbinterruptdraftmode} and \texttt{tcbcontinuedraftmode} cannot be used nested.

\begin{tcbcontinuedraftmode}
Continues the draft mode which was suspended by a preceding \texttt{tcbinterruptdraftmode}. Nothing happens, if there was no draft mode before \texttt{tcbinterruptdraftmode}.
\end{tcbcontinuedraftmode}

Code, which is placed between \texttt{tcbinterruptdraftmode} and \texttt{tcbcontinuedraftmode} is shielded from draft mode.
If set to \texttt{true}, the \textit{draft mode} is started. If set to \texttt{false}, the \textit{draft mode} is stopped.

\begin{mybeamer}{
\texttt{beamer} box
This box looks like a box provided by the \texttt{beamer} class.
\end{mybeamer}

\begin{mybeamer}[draftmode]
\texttt{Beamer box}
This box looks like a box provided by the \texttt{beamer} class.
\end{mybeamer}
The \skins library provides a catalog of skins to choose from which is documented in the following. The \skins library has to be loaded by a package option or inside the preamble by:

\tcbuselibrary{skins}

See Section 10 on page 156 for the documentation of all other options of the \skins library.

- In principle, a skin is applied by choosing a value for /tcb/skin\textsuperscript{P.141}, e.g. enhanced. Since the parts of a breakable box should look different, there are individual skins for breakable boxes, also see Section 19.8 on page 404. Skins for breakable boxes derived from a base skin are called a skin family in the following.

- Instead of setting values for /tcb/skin\textsuperscript{P.141}, equally named options can be used which are shortcuts and which sometimes also change some geometry or style settings. These are the intended options for normal users. Typically, one of the following options is sufficient to select a skin:
  - /tcb/standard\textsuperscript{P.216}
  - /tcb/standard\_jigsaw\textsuperscript{P.217}
  - /tcb/enhanced\textsuperscript{P.218}
  - /tcb/enhanced\_jigsaw\textsuperscript{P.224}
  - /tcb/enhanced\_standard\textsuperscript{P.220}
  - /tcb/enhanced\_standard\_jigsaw\textsuperscript{P.224}
  - /tcb/bicolor\textsuperscript{P.231}
  - /tcb/tile\textsuperscript{P.240}
  - /tcb/beamer\textsuperscript{P.244}
  - /tcb/\textfamilyname{widget}\textsuperscript{P.248}
  - /tcb/empty\textsuperscript{P.251}
  - /tcb/spartan\textsuperscript{P.261}
  - /tcb/draft\textsuperscript{P.262}

Additionally, there are some special applications:

  - /tcb/marker\textsuperscript{P.226}
  - /tcb/blank\textsuperscript{P.220}
  - /tcb/blanker\textsuperscript{P.252}
  - /tcb/blankest\textsuperscript{P.253}
The auxiliary macro \skinExampleSet is used for the following examples to display skin applications. Note that \skinExampleSet is not part of the package, but is defined just for this documentation.

\begin{tcbraster}[raster equal height,raster columns=3, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, #1, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm, sidebyside gap=4mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[sidebyside]
My content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title,sidebyside]
My content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
11.1 Skin Family “standard”

Note that the option keys /tcb/frame style \textsuperscript{P.156}, /tcb/interior style \textsuperscript{P.157}, /tcb/segmentation style \textsuperscript{P.159}, and /tcb/title style \textsuperscript{P.159} are not applicable to the standard skin. Also, watermarks (see Subsection 10.3) are not usable with the standard skin.

\texttt{/tcb/skin=standard} (skin)

This is the standard skin from the core package. All drawing engines are set to type \texttt{standard}. The drawing is based on \texttt{pgf} commands and does not need the \texttt{tikz} package.

Environment and engines for the skin “standard”

<table>
<thead>
<tr>
<th>Engine</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>\texttt{pgfpicture}</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>\texttt{standard}</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>\texttt{standard}</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>\texttt{standard}</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>\texttt{standard}</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>\texttt{standard}</td>
</tr>
</tbody>
</table>

\texttt{/tcb/standard} (style, no value)

This is an abbreviation for setting \texttt{skin=standard}.

\texttt{\skinExampleSet{standard}}

This is my content.

More content.

My content. More content.

My title

This is my content.

More content.

My title

This is my content.

More content.

My title

My content. More content.
This is the standard jigsaw skin from the core package. It differs from the skin standard \textsuperscript{P.216} by its frame engine, see Section 10.11 on page 210.

**Environment and engines for the skin “standard jigsaw”**

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>pgfpicture</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>standardjigsaw</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>standard</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>standard</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>standard</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>standard</td>
</tr>
</tbody>
</table>

This is an abbreviation for setting skin=standard jigsaw.

\skinExampleSet{standard jigsaw, opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,}

This is my content. More content. My content. More content. My title

This is my content. More content. My content. More content. My title

This is my content. More content. My content. More content. My title
If you like the standard appearance of a \texttt{tcolorbox} but you want to have some “enhanced” features, the \texttt{enhanced} skin is what you are looking for.

\texttt{/tcb/skin=enhanced} \hspace{1cm} \text{(skin)}

This skin translates the drawing commands of the core package into \texttt{tikz} path commands. Therefore, it allows all \texttt{tikz} high level options for these paths and has more flexibility compared to the \texttt{standard} skin. You pay for this with some prolonged compilation time. The \texttt{tikz} path options can be given with the option keys \texttt{/tcb/frame style} \texttt{\rightarrow P.156}, \texttt{/tcb/interior style} \texttt{\rightarrow P.157}, \texttt{/tcb/segmentation style} \texttt{\rightarrow P.159}, and \texttt{/tcb/title style} \texttt{\rightarrow P.159}.

\textbf{Environment and engines for the skin “enhanced”}

- \texttt{/tcb/graphical environment} \texttt{\rightarrow P.142}: \texttt{tikzpicture}
- \texttt{/tcb/frame engine} \texttt{\rightarrow P.142}: \texttt{path}
- \texttt{/tcb/interior titled engine} \texttt{\rightarrow P.142}: \texttt{path}
- \texttt{/tcb/interior engine} \texttt{\rightarrow P.143}: \texttt{path}
- \texttt{/tcb/segmentation engine} \texttt{\rightarrow P.143}: \texttt{path}
- \texttt{/tcb/title engine} \texttt{\rightarrow P.143}: \texttt{path}

\texttt{/tcb/enhanced} \hspace{1cm} \text{(style, no value)}

This is an abbreviation for setting \texttt{skin=enhanced}.

\texttt{\\textbackslash skinExampleSet\{enhanced\}}

This is my content. More content. My content. More content.

This is my content. More content. My content. More content.

My title This is my content. More content. My title

My title This is my content. More content. My title
With the “enhanced” skin, it is quite easy to produce fancy looking effects.

Note that this is still a tcolorbox.

Of course, skins can be used for listings also.

\begin{equation}
\int_{1}^{2} \frac{1}{x} \, dx = \ln(2).
\end{equation}
For unbreakable boxes, this is identical to using `/tcb/enhanced`\(^\text{P.218}\). But, for breakable boxes, the \textit{break sequence} is identical to the \texttt{standard}\(^\text{P.216}\) skin, see Section 19.8 from page 404.

This style relies on the skin \texttt{enhanced}\(^\text{P.218}\). All drawing operations are hidden and all margins are set to 0pt. See `/tcb/blanker`\(^\text{P.252}\) for switching off the drawing engines.

\begin{tcolorbox}[blank,watermark text=A blank box]
\lipsum[1]
\end{tcolorbox}

Sometimes, a line is only a line. With \texttt{tcblower} you separate the box content into two functional units. \texttt{tccline} draws only a line which looks like the segmentation line between upper and lower part. Furthermore, you can use \texttt{tccline} more than just once. \texttt{tccline} always uses the \texttt{path} drawing engine. Therefore, the \texttt{/tcb/segmentation style} can be applied.

\begin{tcbox}{enhanced, colframe=blue!50!black, colback=white}
\lipsum[1]
\lipsum[2]
\lipsum[3]
\lipsum[4]
\end{tcbox}


\begin{tcbox}{enhanced, colframe=blue!50!black, colback=white}
\lipsum[1]
\lipsum[2]
\lipsum[3]
\lipsum[4]
\end{tcbox}


Equivalent to \texttt{tccline}, but in a breakable box, \texttt{tccline*} is removed if at a page/box break. Also, it is removed at the end of a box.
This is a flavor of enhanced \( ^{P.218} \) which is used as a first part in a break sequence for enhanced \( ^{P.218} \). Nevertheless, this skin can be applied independently.

Environment and engines for the skin “enhancedfirst”

\[ /tcb/graphical\ environment^{P.142}: \text{tikzpicture} \]
\[ /tcb/frame\ engine^{P.142}: \text{pathfirst} \]
\[ /tcb/interior\ titled\ engine^{P.142}: \text{pathfirst} \]
\[ /tcb/interior\ engine^{P.143}: \text{pathfirst} \]
\[ /tcb/segmentation\ engine^{P.143}: \text{path} \]
\[ /tcb/title\ engine^{P.143}: \text{pathfirst} \]

This is my content.

My title

More content.

This is my content.

My title

This is my content.

My title

More content.

This is my content.

My title

This is my content.

My title

More content.

This is my content.

My title

This is my content.

My title

More content.

This is my content.

My title

This is my content.

My title

More content.

This is a flavor of enhanced \( ^{P.218} \) which is used as a middle part in a break sequence for enhanced \( ^{P.218} \). Nevertheless, this skin can be applied independently.

Environment and engines for the skin “enhancedmiddle”

\[ /tcb/graphical\ environment^{P.142}: \text{tikzpicture} \]
\[ /tcb/frame\ engine^{P.142}: \text{pathmiddle} \]
\[ /tcb/interior\ titled\ engine^{P.142}: \text{pathmiddle} \]
\[ /tcb/interior\ engine^{P.143}: \text{pathmiddle} \]
\[ /tcb/segmentation\ engine^{P.143}: \text{path} \]
\[ /tcb/title\ engine^{P.143}: \text{pathmiddle} \]

This is my content.

My title

More content.

This is my content.

My title

This is my content.

My title

More content.

This is my content.

My title

This is my content.

My title

More content.
This is a flavor of \texttt{enhanced} which is used as a \textit{last} part in a break sequence for \texttt{enhanced}. Nevertheless, this skin can be applied independently.

\begin{table}[h]
\centering
\begin{tabular}{|l|l|}
\hline
\texttt{/tcb/graphical environment} & \texttt{tikzpicture} \\
\hline
\texttt{/tcb/frame engine} & \texttt{pathlast} \\
\hline
\texttt{/tcb/interior titled engine} & \texttt{pathlast} \\
\hline
\texttt{/tcb/interior engine} & \texttt{pathlast} \\
\hline
\texttt{/tcb/segmentation engine} & \texttt{path} \\
\hline
\texttt{/tcb/title engine} & \texttt{pathlast} \\
\hline
\end{tabular}
\caption{Environment and engines for the skin “\texttt{enhancedlast}”}
\end{table}
This is the jigsaw variant of skin \texttt{enhanced}. It differs by its frame engine, see Section 10.11 on page 210.

### Environment and engines for the skin “enhanced jigsaw”

- **/tcb/graphical environment**: \texttt{tikzpicture}
- **/tcb/frame engine**: \texttt{pathjigsaw}
- **/tcb/interior titled engine**: \texttt{path}
- **/tcb/interior engine**: \texttt{path}
- **/tcb/segmentation engine**: \texttt{path}
- **/tcb/title engine**: \texttt{path}

This is an abbreviation for setting \texttt{skin=enhanced jigsaw}.

```tex
\skinExampleSet{enhanced jigsaw, opacityframe=0.5, opacityback=0.5, opacitybacktitle=0.5, }
```

For unbreakable boxes, this is identical to using \texttt{/tcb/enhanced jigsaw}. But, for breakable boxes, the \texttt{break sequence} is identical to the \texttt{standard jigsaw} skin, see Section 19.8 from page 404.
This is the jigsaw variant of skin \texttt{enhancedfirst} \textsuperscript{P.222}. It differs by its frame engine, see Section 10.11 on page 210.

Environment and engines for the skin “\texttt{enhancedfirst jigsaw}”

\begin{tabular}{|l|l|}
\hline
\texttt{/tcb/graphical environment} \textsuperscript{P.142} & \texttt{tikzpicture} \\
\texttt{/tcb/frame engine} \textsuperscript{P.142} & \texttt{pathfirstjigsaw} \\
\texttt{/tcb/interior titled engine} \textsuperscript{P.142} & \texttt{pathfirst} \\
\texttt{/tcb/interior engine} \textsuperscript{P.143} & \texttt{pathfirst} \\
\texttt{/tcb/segmentation engine} \textsuperscript{P.143} & \texttt{path} \\
\texttt{/tcb/title engine} \textsuperscript{P.143} & \texttt{pathfirst} \\
\hline
\end{tabular}

\skinExampleSet{skin=enhancedfirst jigsaw, \opacityframe=0.5, \opacityback=0.5, \opacitybacktitle=0.5, }
This is the jigsaw variant of skin enhancedmiddle. It differs by its frame engine, see Section 10.11 on page 210.

Environment and engines for the skin “enhancedmiddle jigsaw”

/tcb/graphical environment\textsuperscript{P.142}: tikzpicture
/tcb/frame engine\textsuperscript{P.142}: pathmiddlejigsaw
/tcb/interior titled engine\textsuperscript{P.142}: pathmiddle
/tcb/interior engine\textsuperscript{P.143}: pathmiddle
/tcb/segmentation engine\textsuperscript{P.143}: path
/tcb/title engine\textsuperscript{P.143}: pathmiddle

\skinExampleSet{skin=enhancedmiddle jigsaw,
opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,
}

This styles relies on the skin enhancedmiddle jigsaw. It is intended to be used as an optical marker like a highlighter pen.

\begin{tcolorbox}[marker]
\lipsum[2]
\end{tcolorbox}

This example demonstrates the creation of several text marker environments based on enhancedmiddle\textsuperscript{+P.222}.

\begin{verbatim}
tcbset{/textmarker/.style={
  skin=enhancedmiddle jigsaw, breakable, parbox=false, boxrule=0mm, leftrule=5mm, rightrule=5mm, boxsep=0mm, outer arc=0mm, left=3mm, right=3mm, top=1mm, bottom=1mm, toptitle=1mm, bottomtitle=1mm, oversize}}
\newtcolorbox{yellow}{textmarker, colback=yellow!5!white, colframe=yellow}
\newtcolorbox{orange}{textmarker, colback=DarkOrange!5!white, colframe=DarkOrange!75!yellow}
\newtcolorbox{red}{textmarker, colback=red!5!white, colframe=red}
\newtcolorbox{green}{textmarker, colback=DeepSkyBlue!5!white, colframe=DeepSkyBlue}
\newtcolorbox{rainbow}{textmarker, interior hidden, frame style={top color=blue, bottom color=red, middle color=green}}
\begin{yellow}
\lipsum[1-3]
\end{yellow}
\begin{orange}
\lipsum[4]
\end{orange}
\begin{red}
\lipsum[5]
\end{red}
\begin{green}
\lipsum[6]
\end{green}
\begin{blue}
\lipsum[7]
\end{blue}
\begin{rainbow}
\lipsum[8]
\end{rainbow}
\end{verbatim}


Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique,


This is the jigsaw variant of skin `enhancedlast`\(^{P.233}\). It differs by its frame engine, see Section 10.11 on page 210.

### Environment and engines for the skin “enhancedlast”

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphical environment</td>
<td><code>tikzpicture</code></td>
</tr>
<tr>
<td>Frame engine</td>
<td><code>pathlastjigsaw</code></td>
</tr>
<tr>
<td>Interior titled engine</td>
<td><code>pathlast</code></td>
</tr>
<tr>
<td>Interior engine</td>
<td><code>pathlast</code></td>
</tr>
<tr>
<td>Segmentation engine</td>
<td><code>path</code></td>
</tr>
<tr>
<td>Title engine</td>
<td><code>pathlast</code></td>
</tr>
</tbody>
</table>

```latex
\linewidth{\textwidth}
\begin{tcbexample}[set=enhancedlast jigsaw, 
opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,]
This is my content.  
This is my content.  
My title  
This is my content.  
More content.  
My content.  
More content.  
My title  
This is my content.  
More content.  
My content.  
More content.  
\end{tcbexample}
```
11.3 Skin Family “bicolor”

This skin is quite similar to the standard \textsuperscript{P.216} and enhanced \textsuperscript{P.218} skin. But instead of a segmentation line, the optional lower part of the box is filled with a different color or drawn with a different style.

Environment and engines for the skin “bicolor”

* `/tcb/graphical environment` \textsuperscript{P.142}: \texttt{tikzpicture}
* `/tcb/frame engine` \textsuperscript{P.142}: \texttt{path}
* `/tcb/interior titled engine` \textsuperscript{P.142}: \texttt{special}
* `/tcb/interior engine` \textsuperscript{P.143}: \texttt{special}
* `/tcb/segmentation engine` \textsuperscript{P.143}: \texttt{special}
* `/tcb/title engine` \textsuperscript{P.143}: \texttt{path}

- The most basic usage of this skin is to set the background color of the lower part by `/tcb/colbacklower` \textsuperscript{P.232} and all other options like for the standard \textsuperscript{P.216} skin.

```latex
\begin{tcolorbox}[skin=bicolor,title=The title, colframe=FireBrick!75!black,colback=Salmon!50!white,colbacklower=Salmon]
The upper part.
\tcblower
The lower part.
\end{tcolorbox}
```

- The more advanced usage of this skin is to apply the `/tcb/frame style` \textsuperscript{P.156} and the `/tcb/interior style` \textsuperscript{P.157} like for the enhanced \textsuperscript{P.218} skin. Also, the `/tcb/segmentation style` \textsuperscript{P.159} can be used, but it is applied to the whole lower part.

```latex
\begin{tcolorbox}[skin=bicolor,title=The title, frame style={top color=FireBrick, bottom color=FireBrick!15!white,draw=black}, interior style={left color=Salmon,right color=Salmon!50!white}, segmentation style={right color=Salmon,left color=Salmon!50!white}]
The upper part.
\tcblower
The lower part.
\end{tcolorbox}
```
This is an abbreviation for setting `skin=bicolor`.

```
\skinExampleSet{bicolor,
colbacklower=LimeGreen!75!LightGreen,
}
```

This is my content.

More content.

My content.

More content.

My title

This is my content.

My title

This is my content.

My title

My content.

More content.
The following options \texttt{/tcb/colbacklower} and \texttt{/tcb/opacitybacklower} are executed before \texttt{/tcb/segmentation style+P.159}, i.e. \texttt{/tcb/segmentation style+P.159} overrules them.

\texttt{/tcb/colbacklower=(color)} (no default, initially \texttt{black!15!white})

Sets the background \langle color \rangle of the lower part. It depends on the skin, if this value is used.

\begin{tcblisting}{title={Snapshot of the staging area},
        gitexample={The option `-a' automatically stages all tracked and modified files before the commit.\par This can be combined with the message option `-m' as seen in the third line.}}\end{tcblisting}

\begin{tcolorbox}[bicolor,
        frame style={preaction={fill=blue!50!black},
        pattern=checkerboard,pattern color=blue!50!gray},
        fonttitle=\bfseries,
        colback=blue!10, colbacklower=white, opacitybacklower=0.65,
        title={Example for a semilucent lower part}]
This is the upper part.
\tcblower
And that is the lower part.
\end{tcolorbox}

\texttt{/tcb/opacitybacklower=(fraction)} (no default, initially \texttt{1.0})

Sets the background opacity of the lower part to the given \langle fraction \rangle. It depends on the skin, if this value is used.
This is a flavor of \textit{bicolor} \textsuperscript{P.230} which is used as a \textit{first} part in a break sequence for \textit{bicolor} \textsuperscript{P.230}. Nevertheless, this skin can be applied independently.

\begin{table}
\begin{tabular}{|l|l|}
\hline
\texttt{/tcb/graphical environment}\textsuperscript{P.142} & \texttt{tikzpicture} \\
\texttt{/tcb/frame engine}\textsuperscript{P.142} & \texttt{pathfirst} \\
\texttt{/tcb/interior titled engine}\textsuperscript{P.142} & \texttt{special} \\
\texttt{/tcb/interior engine}\textsuperscript{P.143} & \texttt{special} \\
\texttt{/tcb/segmentation engine}\textsuperscript{P.143} & \texttt{special} \\
\texttt{/tcb/title engine}\textsuperscript{P.143} & \texttt{pathfirst} \\
\hline
\end{tabular}
\end{table}

\begin{Verbatim}
\skinExampleSet{skin=bicolorfirst, 
  colbacklower=LimeGreen!75!LightGreen, 
}
\end{Verbatim}
This is a flavor of \texttt{bicolor} \textsuperscript{+P.230} which is used as a \textit{middle} part in a break sequence for \texttt{bicolor} \textsuperscript{+P.230}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “bicolormiddle”

<table>
<thead>
<tr>
<th>Environment/Engine</th>
<th>Engine Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{/tcb/graphical environment} \textsuperscript{+P.142}</td>
<td>\texttt{tikzpicture}</td>
</tr>
<tr>
<td>\texttt{/tcb/frame engine} \textsuperscript{+P.142}</td>
<td>\texttt{pathmiddle}</td>
</tr>
<tr>
<td>\texttt{/tcb/interior titled engine} \textsuperscript{+P.142}</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>\texttt{/tcb/interior engine} \textsuperscript{+P.143}</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>\texttt{/tcb/segmentation engine} \textsuperscript{+P.143}</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>\texttt{/tcb/title engine} \textsuperscript{+P.143}</td>
<td>\texttt{pathmiddle}</td>
</tr>
</tbody>
</table>

```latex
\texttt{\skinExampleSet\{skin=bicolormiddle,}
colbacklower=LimeGreen!75!LightGreen,}
\}
```

This is my content.  
This is my content.  
My content.  
More content.  

My title  
This is my content.  
This is my content.  
My content.  
More content.  

My title  
This is my content.  
This is my content.  
My content.  
More content.  

234
This is a flavor of \textit{bicolor} which is used as a \textit{last} part in a break sequence for \textit{bicolor}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin “bicolorlast”

\begin{verbatim}
\skinExampleSet{skin=bicolorlast, colbacklower=LimeGreen!75!LightGreen, }
\end{verbatim}

This is my content.

More content.

My content.

More content.

This is my content.

This is my content.

My content.

More content.

This is my content.

More content.

My title

My title

My title

My title
This is the jigsaw variant of skin `bicolor`\textsuperscript{P.230}. It differs by its frame engine, see Section 10.11 on page 210.

### Environment and engines for the skin “bicolor jigsaw”

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>graphical environment</td>
<td><code>tikzpicture</code></td>
</tr>
<tr>
<td>frame engine</td>
<td><code>pathjigsaw</code></td>
</tr>
<tr>
<td>interior titled engine</td>
<td><code>special</code></td>
</tr>
<tr>
<td>interior engine</td>
<td><code>special</code></td>
</tr>
<tr>
<td>segmentation engine</td>
<td><code>special</code></td>
</tr>
<tr>
<td>title engine</td>
<td><code>path</code></td>
</tr>
</tbody>
</table>

This is an abbreviation for setting `skin=enhanced jigsaw`.

```latex
\skinExampleSet{bicolor jigsaw, 
colbacklower=LimeGreen!75!LightGreen, 
opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5, 
opacitybacklower=0.5,}
```

This is my content.

My title

More content.
This is the jigsaw variant of skin \texttt{bicolorfirst}. It differs by its frame engine, see Section 10.11 on page 210.

\begin{tabular}{|c|}
\hline
\textbf{Environment and engines for the skin “bicolorfirst jigsaw”} \\
\hline
\end{tabular}

\begin{verbatim}
\skinExampleSet{skin=bicolorfirst jigsaw, 
 colbacklower=LimeGreen!75!LightGreen, 
 opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5, 
 opacitybacklower=0.5, 
}
\end{verbatim}

This is my content. This is my content. My content. More content. 
This is my content. This is my content. My content. More content. 
My title 
This is my content. This is my content. My content. More content. 

This is the jigsaw variant of skin `bicolormiddle`. It differs by its frame engine, see Section 10.11 on page 210.

### Environment and engines for the skin “bicolormiddle jigsaw”

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphical environment</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>Frame engine</td>
<td>pathmiddlejigsaw</td>
</tr>
<tr>
<td>Interior titled engine</td>
<td>special</td>
</tr>
<tr>
<td>Interior engine</td>
<td>special</td>
</tr>
<tr>
<td>Segmentation engine</td>
<td>special</td>
</tr>
<tr>
<td>Title engine</td>
<td>pathmiddle</td>
</tr>
</tbody>
</table>

```latex
\skinExampleSet{s\text{kin}=bicolormiddle\ jigsaw,\ 
colbacklower=LimeGreen!75!LightGreen,\ 
opacityframe=0.5, opacityback=0.5, opacitybacktitle=0.5,\ 
opacitybacklower=0.5,}
```

This is my content. This is my content. My content. More content.

This is my content. My title

This is my content. My title

This is my content. My title

This is my content. My title

More content. More content.
This is the jigsaw variant of skin \texttt{bicolorlast} \textsuperscript{p.235}. It differs by its frame engine, see Section 10.11 on page 210.

Environment and engines for the skin “\texttt{bicolorlast jigsaw}”

\begin{verbatim}
\skinExampleSet{skin=bicolorlast jigsaw, 
    colbacklower=LimeGreen!75!LightGreen, 
    opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5, 
    opacitybacklower=0.5,}
\end{verbatim}

This is my content. This is my content. My content. More content.

This is my content. This is my content. My content. More content.

My title

This is my content. This is my content. My content. More content.

My title

This is my content. This is my content. My content. More content.

My title
11.4 Skin Family “tile”

This skin is a variant of skin \texttt{bicolor} \textsuperscript{P.230}. Especially, the optional lower part of the box is colored by \texttt{colbacklower} \textsuperscript{P.232}. The main difference to \texttt{bicolor} \textsuperscript{P.230} is that \texttt{tile} has no frame.

Environment and engines for the skin “tile”

\begin{itemize}
  \item \texttt{tcb/graphical environment} \textsuperscript{P.142}: \texttt{tikzpicture}
  \item \texttt{tcb/frame engine} \textsuperscript{P.142}: \texttt{empty}
  \item \texttt{tcb/interior titled engine} \textsuperscript{P.142}: \texttt{special}
  \item \texttt{tcb/interior engine} \textsuperscript{P.143}: \texttt{special}
  \item \texttt{tcb/segmentation engine} \textsuperscript{P.143}: \texttt{special}
  \item \texttt{tcb/title engine} \textsuperscript{P.143}: \texttt{path}
\end{itemize}

This key applies \texttt{skin=tile} and in addition changes the geometry and some style options.

\begin{verbatim}
\\skinExampleSet{tile, colbacklower=LimeGreen!75!LightGreen,}
\end{verbatim}

This is my content.

More content.

My title

This is my content.

More content.

My title

This is my content.

More content.
This is a flavor of tile \(^{P.240}\) which is used as a first part in a break sequence for tile \(^{P.240}\). Nevertheless, this skin can be applied independently.

<table>
<thead>
<tr>
<th><strong>Environment and engines for the skin “tilefirst”</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment (^{P.142}): tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine (^{P.142}): empty</td>
</tr>
<tr>
<td>/tcb/interior titled engine (^{P.142}): special</td>
</tr>
<tr>
<td>/tcb/interior engine (^{P.143}): special</td>
</tr>
<tr>
<td>/tcb/segmentation engine (^{P.143}): special</td>
</tr>
<tr>
<td>/tcb/title engine (^{P.143}): pathfirst</td>
</tr>
</tbody>
</table>

\(\text{\texttt{\textbackslash skinExampleSet}}\{\text{skin=tilefirst,}
\text{colbacklower=LimeGreen!75!LightGreen,}
\text{boxrule=0pt,}
\}

This is my content.

This is my content.

My content. More content.

My title

This is my content.

My title

This is my content.

My title

More content.

241
This is a flavor of tile→P.240 which is used as a middle part in a break sequence for tile→P.240. Nevertheless, this skin can be applied independently.

Environment and engines for the skin “tilemiddle”

\skinExampleSet{skin=tilemiddle,
colbacklower=LimeGreen!75!LightGreen,
boxrule=0pt,
}

This is my content.
This is my content.
My content.
More content.

This is my content.
This is my content.
This is my content.
More content.

My title
My title
My title
More content.

My title
My title
My title
More content.
This is a flavor of tile which is used as a last part in a break sequence for tile. Nevertheless, this skin can be applied independently.

**Environment and engines for the skin “tilelast”**

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>graphical environment</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>frame engine</td>
<td>empty</td>
</tr>
<tr>
<td>interior titled engine</td>
<td>special</td>
</tr>
<tr>
<td>interior engine</td>
<td>special</td>
</tr>
<tr>
<td>segmentation engine</td>
<td>special</td>
</tr>
<tr>
<td>title engine</td>
<td>pathlast</td>
</tr>
</tbody>
</table>

```latex
\skinExampleSet{skin=tilelast, 
  colbacklower=LimeGreen!75!LightGreen, 
  boxrule=0pt, 
}
```

This is my content.

More content.

My title

This is my content.

More content.
11.5 Skin Family “beamer”

This skin resembles boxes known from the \texttt{beamer} class and therefore is called “beamer”. It uses the normal colors from the core package but shades them a little bit.

Environment and engines for the skin “beamer”

\begin{tcolorbox}[beamer, colback=Salmon!50!white, colframe=FireBrick!75!black, adjusted title=A colored box with the \enquote{beamer} skin]
This box looks like a box provided by the \texttt{beamer} class.
\end{tcolorbox}
This is a flavor of \texttt{beamer} which is used as a \emph{first} part in a break sequence for \texttt{beamer}. Nevertheless, this skin can be applied independently.

\begin{tabular}{|l|}
\hline
\texttt{/tcb/graphical~environment}~\texttt{\{tikzpicture\}} \hfill
\texttt{/tcb/frame~engine}~\texttt{\{pathfirst\}} \hfill
\texttt{/tcb/interior~titled~engine}~\texttt{\{special\}} \hfill
\texttt{/tcb/interior~engine}~\texttt{\{special\}} \hfill
\texttt{/tcb/segmentation~engine}~\texttt{\{special\}} \hfill
\texttt{/tcb/title~engine}~\texttt{\{pathmiddle\}} \hfill
\texttt{\{special\}} \hfill
\texttt{\{special\}} \hfill
\texttt{\{special\}} \hfill
\texttt{\{special\}} \hfill
\texttt{\{pathmiddle\}} \hfill
\texttt{\{special\}} \hfill
\texttt{\{special\}} \hfill
\texttt{\{pathmiddle\}} \hfill
\texttt{\{special\}} \hfill
\texttt{\{special\}} \hfill
\texttt{\{pathmiddle\}} \hfill
\hline
\end{tabular}

This is my content.

My content.

More content.

This is my content.

More content.

My title

This is my content.

My title

This is my content.

My title

This is my content.

My content.

More content.

This is my content.

More content.

My title

This is my content.

My title

This is my content.

My content.

More content.

This is my content.

More content.

My title

This is my content.

My title

This is my content.

My content.

More content.

This is my content.

More content.

My title

This is my content.

My title

This is my content.

My content.

More content.

This is my content.

More content.

My title

This is my content.

My title

This is my content.

My content.

More content.
This is a flavor of `beamer` [P.244] which is used as a last part in a break sequence for `beamer` [P.244]. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “beamerlast”

- `/tcb/graphical environment` [P.142]: `tikzpicture`
- `/tcb/frame engine` [P.142]: `pathlast`
- `/tcb/interior titled engine` [P.142]: `special`
- `/tcb/interior engine` [P.143]: `special`
- `/tcb/segmentation engine` [P.143]: `special`
- `/tcb/title engine` [P.143]: `pathlast`

```latex
\skinExampleSet{beamer,title filled=false,skin=beamerlast}
```

This is my content.

This is my content.

My title

This is my content.

More content.

My content. More content.

My title

This is my content.

More content.

My title

This is my content.

More content.
11.6 Skin Family “widget”

This skin uses the normal colors from the core package but shades them a little bit. The appearance of the skin can be controlled by \texttt{/tcb/frame style} \textsuperscript{P.156}, \texttt{/tcb/interior style} \textsuperscript{P.157}, and \texttt{/tcb/segmentation style} \textsuperscript{P.159}, if needed.

Environment and engines for the skin “widget”

\begin{itemize}
\item \texttt{/tcb/graphical environment} \textsuperscript{P.142}: \texttt{tikzpicture}
\item \texttt{/tcb/frame engine} \textsuperscript{P.142}: \texttt{path}
\item \texttt{/tcb/interior titled engine} \textsuperscript{P.142}: \texttt{path}
\item \texttt{/tcb/interior engine} \textsuperscript{P.143}: \texttt{path}
\item \texttt{/tcb/segmentation engine} \textsuperscript{P.143}: \texttt{special}
\item \texttt{/tcb/title engine} \textsuperscript{P.143}: \texttt{special}
\end{itemize}

This key applies \texttt{skin=widget} and in addition changes the geometry and some style options.

\texttt{\begin{tcolorbox}\[widget,colback=Salmon!50!white,colframe=FireBrick!75!black, adjusted title=A colored box with the \enquote{widget} skin\]
This is my content.\end{tcolorbox}}

A colored box with the “widget” skin

This is my content.
This is a flavor of \texttt{widget} \textsuperscript{P.248} which is used as a \textit{first} part in a break sequence for \texttt{widget} \textsuperscript{P.248}. Nevertheless, this skin can be applied independently.

\begin{verbatim}
\skinExampleSet{widget,skin=widgetfirst}
\end{verbatim}

\textbf{Environment and engines for the skin “widgetfirst”}

\begin{itemize}
  \item [/tcb/graphical environment] \textsuperscript{P.142}: \texttt{tikzpicture}
  \item [/tcb/frame engine] \textsuperscript{P.142}: \texttt{pathfirst}
  \item [/tcb/interior titled engine] \textsuperscript{P.142}: \texttt{pathfirst}
  \item [/tcb/interior engine] \textsuperscript{P.143}: \texttt{pathfirst}
  \item [/tcb/segmentation engine] \textsuperscript{P.143}: \texttt{special}
  \item [/tcb/title engine] \textsuperscript{P.143}: \texttt{special}
\end{itemize}

This is my content.
This is my content.
More content.

My title
This is my content.
More content.

\textbf{/tcb/skin=widgetmiddle} (skin)

This is a flavor of \texttt{widget} \textsuperscript{P.248} which is used as a \textit{middle} part in a break sequence for \texttt{widget} \textsuperscript{P.248}. Nevertheless, this skin can be applied independently.

\begin{verbatim}
\skinExampleSet{widget,skin=widgetmiddle}
\end{verbatim}

\textbf{Environment and engines for the skin “widgetmiddle”}

\begin{itemize}
  \item [/tcb/graphical environment] \textsuperscript{P.142}: \texttt{tikzpicture}
  \item [/tcb/frame engine] \textsuperscript{P.142}: \texttt{pathmiddle}
  \item [/tcb/interior titled engine] \textsuperscript{P.142}: \texttt{pathmiddle}
  \item [/tcb/interior engine] \textsuperscript{P.143}: \texttt{pathmiddle}
  \item [/tcb/segmentation engine] \textsuperscript{P.143}: \texttt{special}
  \item [/tcb/title engine] \textsuperscript{P.143}: \texttt{special}
\end{itemize}
This is a flavor of \texttt{widget} which is used as a last part in a break sequence for \texttt{widget}. Nevertheless, this skin can be applied independently.

<table>
<thead>
<tr>
<th>Environment and engines for the skin “\texttt{widgetlast}”</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment → P.142: \texttt{tikzpicture}</td>
</tr>
<tr>
<td>/tcb/frame engine → P.142: \texttt{pathlast}</td>
</tr>
<tr>
<td>/tcb/interior titled engine → P.142: \texttt{pathlast}</td>
</tr>
<tr>
<td>/tcb/interior engine → P.143: \texttt{pathlast}</td>
</tr>
<tr>
<td>/tcb/segmentation engine → P.143: \texttt{special}</td>
</tr>
<tr>
<td>/tcb/title engine → P.143: \texttt{special}</td>
</tr>
</tbody>
</table>

\begin{verbatim}
\skinExampleSet{widget,skin=widgetlast}
\end{verbatim}

<table>
<thead>
<tr>
<th>This is my content.</th>
<th>This is my content.</th>
<th>My content.</th>
<th>More content.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More content.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>My title</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is my content.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>My title</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is my content.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>My title</th>
</tr>
</thead>
<tbody>
<tr>
<td>My content.</td>
</tr>
</tbody>
</table>
11.7 Skin Family “empty”

/\tbcb/skin=empty

This skin sets all engines to empty, i.e. nothing is drawn at all. Therefore, this skin is a good starting point to create a complete new style by yourself.

Environment and engines for the skin “empty”

/\tbcb/graphical environment \textsuperscript{P.142}: tikzpicture
/\tbcb/frame engine \textsuperscript{P.142}: empty
/\tbcb/interior titled engine \textsuperscript{P.142}: empty
/\tbcb/interior engine \textsuperscript{P.143}: empty
/\tbcb/segmentation engine \textsuperscript{P.143}: empty
/\tbcb/title engine \textsuperscript{P.143}: empty

Note that the text colors stay unchanged when a skin is applied. Since the standard title color is white, the title of a box with skin empty becomes invisible, if not set to another color by /\tbcb/coltitle \textsuperscript{P.28}.

/\tbcb/empty

This is an abbreviation for setting skin=empty.

\skinExampleSet{empty, coltitle=Navy,borderline={2pt}{0pt}{black!10!white},}

This is my content. This is my content. My content. More content. More content.

My title
This is my content. This is my content. My content. More content.

My title
This is my content. More content. More content.
This style relies on the skin `empty`\(^{\text{P. 251}}\). All engines are set to empty and all margins are set to 0pt. In contrast to `/tcb/blank`\(^{\text{P. 220}}\), the graphical paths are not constructed with exception of the geometry nodes.

\begin{tcolorbox}[blanker,watermark text=A blank box]
\lipsum[1]
\end{tcolorbox}

\begin{tabular}{|c|c|c|}
\hline
A & B & C \\
\hline
\hline
\end{tabular}
This style extends /tcb/blanker → P.252. All engines are set to empty and all margins are set to 0pt. In contrast to /tcb/blanker → P.252, also title, shadow, underlay, overlay, finish and borderline are removed.

% 	cbuselibrary{raster}
\begin{tcbraster}[raster columns=3,raster equal height,
title=Box \thetcbrasternum, enhanced,size=small,colframe=red!50!black,colback=red!10!white, coltitle=yellow!85!black, drop fuzzy shadow,watermark text={Box \thetcbrasternum}, borderline={.25mm}{-0.5mm}{green!40!black}, finish={\begin{tcbclipframe}\draw[blue,opacity=0.1,line width=1cm](frame.south west) -- (frame.north east);\end{tcbclipframe}}, ]
\begin{tcolorbox}\lipsum[4]\end{tcolorbox}
\begin{tcolorbox}[blanker]\lipsum[4]\end{tcolorbox}
\begin{tcolorbox}[blankest]\lipsum[4]\end{tcolorbox}
\end{tcbraster}

Box 1

Box 2
This is a flavor of `empty` which is used as a first part in a break sequence for `empty`. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “emptyfirst”

```
\skinExampleSet{skin=emptyfirst, coltitle=Navy, borderline={2pt}{0pt}{black!10!white}, }
```

This is my content.  
This is my content.  
More content.  

My title  
This is my content.  

My title  
This is my content.  
More content.  

My title  
My content.  
More content.
This is a flavor of \texttt{empty} which is used as a \textit{middle} part in a break sequence for \texttt{empty}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “emptymiddle”

- \texttt{/tcb/graphical environment}: \texttt{tikzpicture}
- \texttt{/tcb/frame engine}: \texttt{empty}
- \texttt{/tcb/interior titled engine}: \texttt{empty}
- \texttt{/tcb/interior engine}: \texttt{empty}
- \texttt{/tcb/segmentation engine}: \texttt{empty}
- \texttt{/tcb/title engine}: \texttt{empty}

```latex
\SkinExampleSet{skin=emptymiddle, coltitle=Navy,borderline={2pt}{0pt}{black!10!white},}
```

This is my content.

This is my content.

My content.

More content.

My title

This is my content.

This is my content.

My title

My content.

More content.
This is a flavor of empty \textsuperscript{P.251} which is used as a last part in a break sequence for empty \textsuperscript{P.251}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “emptylast”

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment \textsuperscript{P.142}</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine \textsuperscript{P.142}</td>
<td>empty</td>
</tr>
<tr>
<td>/tcb/interior titled engine \textsuperscript{P.142}</td>
<td>empty</td>
</tr>
<tr>
<td>/tcb/interior engine \textsuperscript{P.143}</td>
<td>empty</td>
</tr>
<tr>
<td>/tcb/segmentation engine \textsuperscript{P.143}</td>
<td>empty</td>
</tr>
<tr>
<td>/tcb/title engine \textsuperscript{P.143}</td>
<td>empty</td>
</tr>
</tbody>
</table>

```latex
\verb+\skinExampleSet{skin=emptylast,\+coltitle=Navy,\+borderline={2pt}{0pt}{black!10!white},}\+
```

This is my content.  
This is my content.  
My content.  

More content.  
This is my content.  
This is my content.  
My title 
This is my content.  
My title 
My content.  

More content.  
My content.  

More content.
This example demonstrates a breakable customized box. Here, we define an environment `freebox`. The first application of `freebox` produces an unbroken `tcolorbox`. The box is drawn by the code given by `/tcb/frame code` and `/tcb/interior code`.

The second application of `freebox` is broken into several parts which are drawn by the codes given by `/tcb/skin first is subskin of`, `/tcb/skin middle is subskin of`, and `/tcb/skin last is subskin of`.

```latex
% Preamble:
\usepackage{tikz,lipsum}
\tcbuselibrary{skins,breakable}
\tikzset{coltria/.style={fill=red!15!white}}
\newtcolorbox{freebox}[1][{}]{empty,
  breakable,height fixed for=first and middle,
  leftrule=5mm,left=2mm,
  frame style={fill,top color=red!75!black,bottom color=red!75!black,middle color=red},
  colback=yellow!50!white,
  watermark color=red!50!yellow!75!white, 
  watermark text on=unbroken is unbroken box,
  watermark text on=first is first part,
  watermark text on=middle is middle part, 
  watermark text on=last is last part,
  % code for unbroken boxes: 
  frame code={\path[\tcb fill frame] (frame.south west)--(frame.north west)
    --([yshift=-5mm]frame.north east)--([yshift=-5mm]frame.north east)
    --([yshift=5mm]frame.south east)--([yshift=5mm]frame.south east)
    --cycle; },
  interior code={\path[\tcb fill interior] (interior.south west)--(interior.north west)
    --([yshift=-4.8mm]interior.north east)--([yshift=-4.8mm]interior.north east)
    --([yshift=4.8mm]interior.south east)--([yshift=4.8mm]interior.south east)
    --cycle; },
  % code for the first part of a break sequence: 
  skin first is subskin of={emptyfirst}{
    frame code={\path[\tcb fill frame] (frame.south west)--(frame.north west)
    --([yshift=-5mm]frame.north east)--([yshift=-5mm]frame.north east)
    --([yshift=5mm]frame.south east)--([yshift=5mm]frame.south east)
    --cycle; },
    \path[coltria] ([xshift=2.5mm,yshift=1mm]frame.south west) -- +(120:2mm)
    -- +(60:2mm) -- cycle; },
  interior code={\path[\tcb fill interior] (interior.south west)--(interior.north west)
    --([yshift=-4.8mm]interior.north east)--(interior.south east)
    --[yshift=4.8mm]interior.north east)--(interior.south east)
    --cycle; },
  % code for the middle part of a break sequence: 
  skin middle is subskin of={emptymiddle}{
    frame code={\path[\tcb fill frame] (frame.south west)--(frame.north west)
    --([yshift=-5mm]frame.north east)--([yshift=-5mm]frame.north east)
    --cycle; },
    \path[coltria] ([xshift=2.5mm,yshift=-1mm]frame.north west) -- +(240:2mm)
    -- (300:2mm) -- cycle; },
  interior code={\path[\tcb fill interior] (interior.south west)--(interior.north west)
    --(interior.north east)--cycle; },
  % code for the last part of a break sequence: 
  skin last is subskin of={emptylast}{
    frame code={\path[\tcb fill frame] (frame.south west)--(frame.north west)
    --([yshift=-5mm]frame.north east)--([yshift=-5mm]frame.north east)
    --(300:2mm) -- cycle; },
    \path[coltria] ([xshift=2.5mm,yshift=-1mm]frame.north west) -- +(240:2mm)
    -- (300:2mm) -- cycle; }
```

257


11.8 Skin “spartan”

```
/tcb/skin=spartan
```

This skin is quite... spartan. It supports no rounded corners, no overlays, no shadows, no borderlines, and no finishes. The only exception are underlays. One cannot do very fancy things with this skin, but it compiles very fast. Therefore, the spartan skin is used for the draft mode, see Section 10.12 on page 212. Nevertheless, it can be used as a normal skin.

---

**Environment and engines for the skin “spartan”**

```
/tcb/graphical environment\textsuperscript{\textit{P.142}}: tikzpicture
/tcb/frame engine\textsuperscript{\textit{P.142}}: spartan
/tcb/interior titled engine\textsuperscript{\textit{P.142}}: spartan
/tcb/interior engine\textsuperscript{\textit{P.143}}: spartan
/tcb/segmentation engine\textsuperscript{\textit{P.143}}: spartan
/tcb/title engine\textsuperscript{\textit{P.143}}: spartan
```

---

```
/tcb/spartan
```

This is an abbreviation for setting `skin=spartan`.

---

```
\skinExampleSet{spartan}
```

---

This is my content. This is my content. My content. More content.

More content.

My title

This is my content. This is my content. My title

My content. More content.

More content.
11.9 Skin “draft”

This skin is intended to be used while drafting new geometric settings for a \texttt{tcolorbox}.

Environment and engines for the skin “draft”

\begin{itemize}
  \item \texttt{tcb/graphical environment} \texttt{\textsuperscript{P.142}}: \texttt{tikzpicture} \texttt{special}
  \item \texttt{tcb/frame engine} \texttt{\textsuperscript{P.142}}: \texttt{special}
  \item \texttt{tcb/interior titled engine} \texttt{\textsuperscript{P.142}}: \texttt{special}
  \item \texttt{tcb/interior engine} \texttt{\textsuperscript{P.143}}: \texttt{special}
  \item \texttt{tcb/segmentation engine} \texttt{\textsuperscript{P.143}}: \texttt{path}
  \item \texttt{tcb/title engine} \texttt{\textsuperscript{P.143}}: \texttt{path}
\end{itemize}

This is an abbreviation for setting \texttt{skin=draft}.

\begin{tcbexample}
\begin{tcbexampleenv}
\begin{tcbexamplecontent}
This is my content.
\end{tcbexamplecontent}
\end{tcbexampleenv}
\end{tcbexample}


This skin family “freelance” is deprecated with \tcolorbox 3.00. It is not longer needed, because \tcb/frame code \textsuperscript{P.145}, \tcb/interior code \textsuperscript{P.146}, \tcb/interior titled code \textsuperscript{P.145}, and \tcb/title code \textsuperscript{P.147} can be applied to every skin now. In this sense, everything has become \textit{freelance} now.

For users of \tcb/freelance: Old code should continue to work. There may be exceptions for breakable freelance boxes under certain circumstances. For new code, use \tcb/empty \textsuperscript{P.251} or \tcb/enhanced \textsuperscript{P.218} where you would have used \tcb/freelance before.

\texttt{/tcb/skin=freelance} \hspace{2cm} (skin)

This skin gives full freedom for the appearance of the \tcolorbox. All drawing engines are set to type \textit{freelance}; they use the \texttt{tikz} package and compute the \tcb/geometry nodes \textsuperscript{P.144}.

Environment and engines for the skin “freelance”

\begin{itemize}
  \item \texttt{/tcb/graphical environment} \textsuperscript{P.142}: \texttt{tikzpicture}
  \item \texttt{/tcb/frame engine} \textsuperscript{P.142}: \texttt{freelance}
  \item \texttt{/tcb/interior titled engine} \textsuperscript{P.142}: \texttt{freelance}
  \item \texttt{/tcb/interior engine} \textsuperscript{P.143}: \texttt{freelance}
  \item \texttt{/tcb/segmentation engine} \textsuperscript{P.143}: \texttt{freelance}
  \item \texttt{/tcb/title engine} \textsuperscript{P.143}: \texttt{freelance}
\end{itemize}

\texttt{/tcb/freelance} \hspace{2cm} (style, no value)

This is an abbreviation for setting \texttt{skin=freelance}.

\texttt{/tcb/skin=freelancefirst} \hspace{2cm} (skin)

This skin equals \textit{freelance} with exception of the break sequence, see Section 19.8 on page 404.

\texttt{/tcb/skin=freelancemiddle} \hspace{2cm} (skin)

This skin equals \textit{freelance} with exception of the break sequence, see Section 19.8 on page 404.

\texttt{/tcb/skin=freelancelast} \hspace{2cm} (skin)

This skin equals \textit{freelance} with exception of the break sequence, see Section 19.8 on page 404.

\texttt{/tcb/extend freelance=\langle options\rangle} \hspace{2cm} (no default, initially empty)

The \langle \texttt{options} \rangle are added to the skin definition of \textit{freelance}.

\texttt{/tcb/extend freelancefirst=\langle options\rangle} \hspace{2cm} (no default, initially empty)

The \langle \texttt{options} \rangle are added to the skin definition of \textit{freelancefirst} which is used as first part of the break sequence of \textit{freelance}. See \texttt{/tcb/skin first is subskin of} \textsuperscript{P.148} for a substitute of this key.

\texttt{/tcb/extend freelancemiddle=\langle options\rangle} \hspace{2cm} (no default, initially empty)

The \langle \texttt{options} \rangle are added to the skin definition of \textit{freelancemiddle} which is used as middle part of the break sequence of \textit{freelance}. See \texttt{/tcb/skin middle is subskin of} \textsuperscript{P.148} for a substitute of this key.

\texttt{/tcb/extend freelancelast=\langle options\rangle} \hspace{2cm} (no default, initially empty)

The \langle \texttt{options} \rangle are added to the skin definition of \textit{freelancelast} which is used as last part of the break sequence of \textit{freelance}. See \texttt{/tcb/skin last is subskin of} \textsuperscript{P.148} for a substitute of this key.

264
12 Inclusion of Boxed Image Files

The skins library adds some commands to conveniently include boxed image files. For the following macros and options, the skins library has to be loaded by a package option or inside the preamble by:

\tcbuselibrary{skins}

See Section 10 on page 156 for the documentation of all other options of the skins library.

12.1 Macros

\tcbincludegraphics[(options)]{file name}

In principle, this macro includes an image file denoted by file name using the standard \includegraphics and puts it into a tcolorbox. The (options) are tcolorbox keys to set up the colored box. Use /tcb/graphics options to specify options for the underlying \includegraphics. Some tcolorbox option keys are automatically set, namely /tcb/enhanced and options to center the image inside the box.

The sizing of the included image is done depending on the following:

- If a /tcb/width is specified, but no fixed /tcb/height, the image is sized to fill the inner width of the box. The height of the box adapts to the image.
- If a fixed /tcb/height is specified, the image is sized to fill the fixed inner area of the box.
- If the /tcb/capture mode /tcb/hbox is specified, the image is sized according to given \includegraphics options only. The box adapts to the image.

% \tcbuselibrary{raster}
\begin{tcbraster}[raster columns=3,raster force size=false,size=fbox, colframe=red!50!black,colback=red!20!black, fonttitle=\bfseries,center title,drop fuzzy shadow]
\tcbincludegraphics[title=Normal]{goldshade.png}
\tcbincludegraphics[title=Fixed height,height=3cm]{goldshade.png}
\tcbincludegraphics[title=hbox mode,hbox,graphics options={width=3cm}]{goldshade.png}
\end{tcbraster}
The auxiliary macro $\texttt{imagnam}e$ may be used inside $\texttt{tcbinclud}egraphi\texttt{c}$\textsuperscript{*}P.265 to display the name of the file. $\texttt{imagnam}e$ is already partially detokenized and is allowed to contain special characters like the underscore. Note that an appropriate font is required to display such characters.

\begin{tcbarray}[size=fbox, colframe=red!50!black, colback=red!20!black, fonttitle=\bfseries\texttt{tffamily},center title,drop fuzzy shadow]
\texttt{tcbinclud}egraphi\texttt{c}[title=$\texttt{imagnam}e$]{goldshade.png}
\texttt{tcbinclud}egraphi\texttt{c}[finish={
\node[fill=white,fill opacity=0.5,text opacity=1]
at (frame.center) {$\texttt{imagnam}e$};\}]{blueshade.png}
\end{tcbarray}
This is a generalized version of \tcblincludegraphics\textsuperscript{P.265} which allows to include a complete PDF file denoted by \texttt{file name}. Every page is boxed into an own \texttt{tcolorbox}\textsuperscript{P.12} customized by the given \texttt{options}. It is reasonable to put such a series of boxes inside a \texttt{tcb\_raster}\textsuperscript{P.300} for alignment.
Use \texttt{/tcb/graphics pages=\textsuperscript{P.268}} to use a selection of pages instead of using the whole file. The auxiliary macro \texttt{\texttt{imagepage}} may be used inside \texttt{\texttt{tcbl\_includepdf}} to display the current page number.

\begin{tcb\_raster}{raster columns=3,colframe=blue,colback=white, colbacktitle=blue!50!white, fonttitle=\texttt{\small\texttt{bfseries}}\texttt{\ttfamily}, left=0pt,right=0pt,top=0pt,bottom=0pt,boxsep=0pt,boxrule=0.6pt, top\texttt{\texttt{title}}=1\texttt{\texttt{mm}},bottom\texttt{\texttt{title}}=1\texttt{\texttt{mm}},drop lifted shadow,center title, graphics pages={1,...,6},title={\texttt{\texttt{imagepage}}}}
\texttt{\texttt{imagepage}}
\end{tcb\_raster}
12.2 Option Keys

\texttt{/tcb/graphics options=\langle options\rangle} \hspace{1cm} (no default, initially empty)

Used for \texttt{\textbackslash tcbincludegraphics} \hspace{.5cm} \textsuperscript{P.265} and \texttt{\textbackslash tcbincludepdf} \hspace{.5cm} \textsuperscript{P.267} to specify \texttt{\textbackslash includegraphics} \hspace{.5cm} \texttt{\langle options\rangle}.

\begin{verbatim}
\% \texttt{\textbackslash \texttt{tcbselibrary\{raster\)}}
\begin{tcbraster}\[raster columns=3,size=fbox,raster equal height,
colframe=red!50!black,colback=red!20!black,drop fuzzy shadow\]
\tcbincludegraphics{goldshade.png}
\newcommand{\myangle}{angle=20}\%
\tcbincludegraphics[graphics options=\myangle]{goldshade.png}
\tcbincludegraphics[graphics options={viewport=0cm 0cm 8cm 4cm,clip}]{goldshade.png}
\end{tcbraster}
\end{verbatim}

\texttt{/tcb/graphics directory=\langle directory\rangle} \hspace{1cm} (no default, initially empty)

Used for \texttt{\textbackslash tcbincludegraphics} \hspace{.5cm} \textsuperscript{P.265} and \texttt{\textbackslash tcbincludepdf} \hspace{.5cm} \textsuperscript{P.267} to specify a file system \langle directory\rangle where the image files are located.

\begin{verbatim}
\texttt{\textbackslash tcbset}\{
  \texttt{graphics directory=\{.\),
  \texttt{graphics directory=\{examples\},
  \texttt{graphics directory=\{..../..../pictures\},
\}
\end{verbatim}

\textbf{The \texttt{\textbackslash graphicspath} macro from the \texttt{\textbackslash graphics} package is superior to this option.}

\texttt{\textbackslash tcb/graphics directory} may be used especially for \texttt{\textbackslash tcbincludepdf} \hspace{.5cm} \textsuperscript{P.267}.

\texttt{/tcb/graphics pages=\langle selection\rangle} \hspace{1cm} (no default, initially 1,\ldots,\texttt{\pdfpages})

Used for \texttt{\textbackslash tcbincludepdf} \hspace{.5cm} \textsuperscript{P.267} to specify a \langle selection\rangle of pages to be included. The largest page number is accessible by \texttt{\pdfpages}. The \langle selection\rangle has to be given using the \texttt{\textbackslash foreach} syntax of Ti\textit{kZ}.

\begin{verbatim}
\texttt{\textbackslash tcbset}\{
  \texttt{graphics pages=\{1,3,7\),
  \texttt{graphics pages=\{1,\ldots,10\},
  \texttt{graphics pages=\{1,3,\ldots,18\},
  \texttt{graphics pages=\{100,\ldots,\texttt{\pdfpages}\},
\}
\end{verbatim}
/tcb/graphics orientation=⟨orientation⟩ (no default, initially as-is)

Used for \tcbincludegraphics→P.265 and \tcbincludepdf→P.267 to guarantee a certain ⟨orientation⟩ of the included image. After all other options for the image are processed, the result is possibly rotated to be in landscape or portrait mode.

Feasible values for ⟨orientation⟩ are:

- **as-is**: no rotation of the processed image.
- **landscape**: the processed image is possibly rotated by 90 degrees to ensure that the final width is not smaller than the final height.
- **landscape∗**: the processed image is possibly rotated by -90 degrees to ensure that the final width is not smaller than the final height.
- **portrait**: the processed image is possibly rotated by 90 degrees to ensure that the final height is not smaller than the final width.
- **portrait∗**: the processed image is possibly rotated by -90 degrees to ensure that the final height is not smaller than the final width.

% \tcbselibrary{raster}
\begin{tcbraster}[raster columns=6,size=fbox,raster equal height, colframe=red!50!black,colback=red!20!black,drop fuzzy shadow]
\tcbincludegraphics{Basilica_5.png}
\tcbincludegraphics[graphics orientation=landscape]{Basilica_5.png}
\tcbincludegraphics[graphics orientation=portrait]{Basilica_5.png}
\tcbincludegraphics[graphics orientation=portrait∗]{Basilica_5.png}
\tcbincludegraphics[graphics options={viewport=0cm 0cm 2cm 3cm,clip}]{goldshade.png}
\tcbincludegraphics[graphics options={viewport=0cm 0cm 2cm 3cm,clip},
  graphics orientation=landscape]{goldshade.png}
\end{tcbraster}
13 TikZ Image and Picture Fill Extensions; Auxiliary Macros

The \texttt{skins} library adds some image and picture fill options to the vast option set of TikZ \cite{tikz}. These options can be used in any \texttt{tikzpicture}. For the following options, the \texttt{skins} library has to be loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{skins}
\end{verbatim}

See Section 10 on page 156 for the documentation of all other options of the \texttt{skins} library.

13.1 Fill Plain

\texttt{/tikz/fill plain image}=(\texttt{file name})

(no default, initially unset)

Fills the current path with an external image referenced by \texttt{\langle file name\rangle}. The image is put in the center of the path, but it is not resized to fit into the path area.

\begin{verbatim}
\begin{tikzpicture}
  \path[draw,fill plain image=goldshade.png]
    (2.75,-0.75) -- (3,0) -- (2.75,0.75)
    \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
\end{verbatim}

\texttt{/tikz/fill plain image*=}=(\texttt{file name})

(no default, initially unset)

Fills the current path with an external image referenced by \texttt{\langle file name\rangle}. The image is put in the center of the path, but it is not resized to fit into the path area. The \texttt{\langle graphics options\rangle} are given to the underlying \texttt{includegraphics} command.

\begin{verbatim}
\begin{tikzpicture}
  \path[draw,fill plain image*=\texttt{width=2.5cm}\{goldshade.png\}]
    (2.75,-0.75) -- (3,0) -- (2.75,0.75)
    \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
\end{verbatim}

\texttt{/tikz/fill plain picture}=(\texttt{graphical code})

(no default, initially unset)

Fills the current path with the given \texttt{\langle graphical code\rangle}. The result is put in the center of the path, but it is not resized to fit into the path area. Note that this is almost identical to the standard path picture option.

\begin{verbatim}
\begin{tikzpicture}
  \path[draw,fill plain picture=\texttt{\%
    \draw[red!50!yellow,line width=2mm]
      (0,0) circle (1cm);
    \draw[red,line width=5mm] (-1,-1) -- (1,1);
    \draw[red,line width=5mm] (-1,1) -- (1,-1);
  ]
    (2.75,-0.75) -- (3,0) -- (2.75,0.75)
    \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
\end{verbatim}
13.2 Fill Stretch

`tikz/fill stretch image=(file name)` (no default, initially unset)
Fills the current path with an external image referenced by `(file name)`. The image is stretched to fill the path area.

```tikz
\begin{tikzpicture}
\path[fill stretch image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```

`tikz/fill stretch image*=({graphics options})(file name)` (no default, initially unset)
Fills the current path with an external image referenced by `(file name)`. The `{graphics options}` are given to the underlying `\includegraphics` command. The image is stretched to fill the path area.

```tikz
\begin{tikzpicture}
\path[fill stretch image*=
{angle=90,origin=c}{goldshade.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```

`tikz/fill stretch picture=(graphical code)` (no default, initially unset)
Fills the current path with the given `(graphical code)`. The result is stretched to fill the path area.

```tikz
\begin{tikzpicture}
\path[draw,fill stretch picture={%
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```
13.3 Fill Overzoom

/\texttt{tikz/fill overzoom image}=(file name)  
\hspace{10pt} (no default, initially unset)  

Fills the current path with an external image referenced by \texttt{(file name)}. The image is zoomed such that the path area fills the image.

\begin{tikzpicture}  
\path[fill overzoom image=goldshade.png]  
(2.75,-0.75) -- (3,0) -- (2.75,0.75)  
\foreach \w in {45,90,...,315}  
{ -- (\w:1.5cm) } -- cycle;  
\end{tikzpicture}

/\texttt{tikz/fill overzoom image*}={⟨graphics options⟩}(⟨file name⟩)  
\hspace{10pt} (no default, initially unset)  

Fills the current path with an external image referenced by \texttt{(file name)}. The \texttt{(graphics options)} are given to the underlying \texttt{\includegraphics} command. The image is zoomed such that the path area fills the image.

\begin{tikzpicture}  
\path[fill overzoom image*=\{angle=90,origin=c\}]{goldshade.png}]  
(2.75,-0.75) -- (3,0) -- (2.75,0.75)  
\foreach \w in {45,90,...,315}  
{ -- (\w:1.5cm) } -- cycle;  
\end{tikzpicture}

/\texttt{tikz/fill overzoom picture}={⟨graphical code⟩}  
\hspace{10pt} (no default, initially unset)  

Fills the current path with the given \texttt{(graphical code)}. The result is zoomed such that the path area fills the image.

\begin{tikzpicture}  
\path[draw,fill overzoom picture={\%  
\draw[red!50!yellow,line width=2mm]  
(0,0) circle (1cm);  
\draw[red,line width=5mm] (-1,-1) -- (1,1);  
\draw[red,line width=5mm] (-1,1) -- (1,-1);  
}]  
(2.75,-0.75) -- (3,0) -- (2.75,0.75)  
\foreach \w in {45,90,...,315}  
{ -- (\w:1.5cm) } -- cycle;  
\end{tikzpicture}
13.4 Fill Zoom

\tikz/fill zoom image=(file name)  (no default, initially unset)

Fills the current path with an external image referenced by (file name). The image is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill zoom image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\tikz/fill zoom image*=⟨graphics options⟩{(file name)}  (no default, initially unset)

Fills the current path with an external image referenced by (file name). The ⟨graphics options⟩ are given to the underlying \includegraphics command. The image is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill zoom image*=angle=90,origin=c]{goldshade.png}
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\tikz/fill zoom picture=(graphical code)  (no default, initially unset)

Fills the current path with the given ⟨graphical code⟩. The result is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill zoom picture={% 
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.5 Fill Shrink

\begin{tikzpicture}
\path\[draw,fill shrink image=goldshade.png\]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\begin{tikzpicture}
\path\[draw,fill shrink image\*={width=1.5cm}{goldshade.png}\]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\begin{tikzpicture}
\path\[draw,fill shrink picture={\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);\}\]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\begin{tikzpicture}
\path\[draw,fill shrink picture={%\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);\}\]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\begin{tikzpicture}
\path\[draw,fill shrink image=\{\draw[red]\}
(0,0) circle (1cm);\draw[red] (-1,-1) -- (1,1);
\draw[red] (-1,1) -- (1,-1);\}
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.6 Fill Tile

/tikz/fill tile image=(file name) (no default, initially unset)
Fills the current path with a tile pattern using an external image referenced by ⟨file name⟩.

\begin{tikzpicture}
\path\[fill tile image=pink_marble.png\]
(2.75,-0.75) -- (3.0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill tile image*={(⟨graphics options⟩){(file name)}} (no default, initially unset)
Fills the current path with a tile pattern using an external image referenced by ⟨file name⟩. The ⟨graphics options⟩ are given to the underlying \includegraphics command.

\begin{tikzpicture}
\path\[fill tile image*={width=1cm}{pink_marble.png}\]
(2.75,-0.75) -- (3.0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill tile picture=(graphical code) (no default, initially unset)
Fills the current path with a tile pattern using the given ⟨graphical code⟩.

\begin{tikzpicture}
\path\[draw,fill tile picture={% \draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3.0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill tile picture*={(fraction){(graphical code)}} (no default, initially unset)
Fills the current path with a tile pattern using the given ⟨graphical code⟩. The graphic is resized by ⟨fraction⟩.

\begin{tikzpicture}
\path\[draw,fill tile picture*={0.25}{% \draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3.0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.7 Filling Options

/\texttt{tikz/fill image opacity}=⟨\texttt{fraction}⟩
(no default, initially 1.0)

Sets the fill opacity for the image or picture fill options to the given ⟨fraction⟩.

\begin{tikzpicture}
\path[fill stretch image=goldshade.png] (0,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.75] (2,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.5] (4,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.25] (6,0) circle (1cm);
\path[fill=red] (8,0) circle (1cm);
\end{tikzpicture}

/\texttt{tikz/fill image scale}=⟨\texttt{fraction}⟩
(no default, initially 1.0)

Stretches, zooms, overzooms or shrinks the image or picture to the given ⟨fraction⟩ of the width and height of the current path.

\begin{tikzpicture}
\path[draw,fill zoom image=goldshade.png] (0,0) rectangle +(2,2);
\path[draw,fill zoom image=goldshade.png,fill image scale=0.75] (3,0) rectangle +(2,2);
\path[draw,fill zoom image=goldshade.png,fill image scale=1.5] (6,0) rectangle +(2,2);
\end{tikzpicture}

/\texttt{tikz/fill image options}=⟨\texttt{graphics options}⟩
(no default, initially empty)

The ⟨graphics options⟩ are given to the underlying \texttt{\includegraphics} command for the image fill options. This can be just together with /\texttt{tikz/fill stretch image} \textsuperscript{P.271}, /\texttt{tikz/fill overzoom image} \textsuperscript{P.272}, /\texttt{tikz/fill zoom image} \textsuperscript{P.273}, and /\texttt{tikz/fill tile image} \textsuperscript{P.275}.

\begin{tikzpicture}
\path[fill image options={width=1cm}, fill tile image=pink_marble.png] (2.75,-0.75) -- (3,0) -- (2.75,0.75) -- cycle;
\end{tikzpicture}

276
13.8 Straightening of the Arcs

This patch is considered as an experimental feature. It changes some of the original \textit{TikZ} code. This change may break with future updates of \textit{TikZ}.

\begin{verbatim}
\begin{tikzpicture}
\node[fill stretch image=blueshade.png]
  (A) at (120:3cm) {A};
\node[fill stretch image=goldshade.png]
  (B) at (60:3cm) {B};
\node[
  preaction={fill stretch image=blueshade.png},
  fill stretch image=goldshade.png,
  fill image opacity=0.5
] (C) {C};
\path (A) -- node{$+$} (B);
\draw[->,very thick] (A)--(C);
\draw[->,very thick] (B)--(C);
\end{tikzpicture}
\end{verbatim}

\texttt{\texttt{tcbpatcharcangular}}

The \textit{TikZ} package provides a nice rounded corners option to replace all corners by little arcs. \texttt{\texttt{tcbpatcharcangular}} is a patch which straightens the arcs. To say it more prosaic, the little arcs are replaced by little straight lines.

\begin{verbatim}
\begin{tikzpicture}
\draw[thick,rounded corners=8pt]
  (0,0) -- (0,2) -- (1,3.25) -- (2,2) -- (2,0)
  -- (0,2) -- (2,2) -- (0,0) -- (2,0);
\tcbpatcharcangular
\draw[thick,rounded corners=8pt,xshift=2.5cm]
  (0,0) -- (0,2) -- (1,3.25) -- (2,2) -- (2,0)
  -- (0,2) -- (2,2) -- (0,0) -- (2,0);
\end{tikzpicture}
\end{verbatim}

\texttt{\texttt{tcbpatcharcround}}

This macro reverts \texttt{\texttt{tcbpatcharcangular}}, i.e., the patch from \texttt{\texttt{tcbpatcharcangular}} is replaced by the original code.
13.9 Extracting Node Dimensions

The following auxiliary macros are defined by the \texttt{skins} library. They allow to determine the width and height of an arbitrary Ti\textit{k}Z node. To be more specific, they determine the east-to-west and the north-to-south dimensions which may be not the maximal dimensions for a non-rectangular node. Note that the following dimensions are measured exactly including the line width of the border line. If a new rectangle or node with the same dimensions and a border is to be drawn, this border width has to be substracted.

\begin{verbatim}
\tcbsettowidthofnode{(register)}{(node)}
Sets the east-to-west dimension of the given \texttt{node} to the \TeX\ \texttt{register}.
\end{verbatim}

\begin{verbatim}
\tcbsetmacrotowidthofnode{(macro)}{(node)}
Defines \texttt{macro} as the east-to-west dimension of the given \texttt{node}.
\end{verbatim}

\begin{verbatim}
\tcbsettoheightofnode{(register)}{(node)}
Sets the north-to-south dimension of the given \texttt{node} to the \TeX\ \texttt{register}.
\end{verbatim}

\begin{verbatim}
\tcbsetmacrotoheightofnode{(macro)}{(node)}
Defines \texttt{macro} as the north-to-south dimension of the given \texttt{node}.
\end{verbatim}

13.10 Hyper Nodes

The following auxiliary macro is defined by the \texttt{skins} library.

\begin{verbatim}
\tcbhypernode{(macro)}{(node)}
Applies a hyperlink creating \texttt{macro} from the package \texttt{hyperref} \cite{15} to an existing \texttt{tikz} \texttt{node}. \tcbhypernode can only be used inside a \texttt{tikzpicture} environment. The last argument of the \texttt{macro} is to be omitted and should stand for an object (text) which is to be made a hyperlink. For example, use \texttt{\hyperref[name]} instead of \texttt{\hyperref[name]{text}}.
\end{verbatim}
14 Beamer Support

The \texttt{skins} library adds some supporting options for the \texttt{beamer} package [23]. For the following options, the \texttt{skins} library has to be loaded by a package option or inside the preamble by:

\begin{verbatim}
tcbuselibrary{skins}
\end{verbatim}

See Section 10 on page 156 for the documentation of all other options of the \texttt{skins} library.

\texttt{/tcb/only=<\langle overlay specification \rangle>\{\langle options \rangle\}} (style, no default, initially unset)

Sets the given \texttt{tcolorbox} (\texttt{options}) in dependency of a \texttt{beamer} (\texttt{overlay specification}). Note that this needs the \texttt{beamer} class [23]. The (\texttt{options}) will only be used on the specified \texttt{beamer} frames.

\begin{verbatim}
\documentclass{beamer}
\usepackage[many]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcolorbox}[title=My title,fonttitle=\bfseries, enhanced,colframe=red!50!black,colback=red!10,colbacktitle=red, sidebyside,righthand width=3cm, lowerbox=invisible,lower separated=false, drop lifted shadow, only=<1>{colbacktitle=yellow,coltitle=red!50!black,colframe=red}, only=<3>{colback=yellow!50,watermark text={Attention!}}, only=<3->{lowerbox=visible} ]
This is a test.
\begin{itemize}[<+->]
  \item One
  \item Two
  \item \alert<3>{Three}
  \item Four
\end{itemize}
\tcblower
\begin{equation*}
\int\limits_{1}^{x} \frac{1}{t}~dt = \ln(x).
\end{equation*}
\end{tcolorbox}
\end{frame}
\end{document}
\end{verbatim}

My title
This is a test.
▶ One
▶ Two
\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}[fragile]
\begin{tcblisting}{beamer,colback=blue!5,colframe=blue!20!gray,coltitle=yellow,
title=Example,
only=<1>{lowerbox=invisible},only=<2>{}
}
This is an \textbf{example listing}
\end{tcblisting}
\end{frame}
\end{document}
/tcb/alert=<\{overlay specification\}> (style, no default, initially unset)

Sets the /tcb/beamer alerted style in dependency of a beamer \{overlay specification\}. /tcb/beamer alerted can be redefined for customization.

/tcb/beamer alerted (style, no options, initially fuzzy halo)

This style is not intended to be used directly, but in concealed way by applying /tcb/alert. The style can be redefined.

\tcbset{
beamer alerted/.style={colframe=red!50!gray},
}

The following examples use tcbitemize\textsuperscript{P.301} from \texttt{raster} for convenient use of a list of boxes which are uncovered one by one.

\documentclass\{beamer\}
\usepackage\{tcolorbox\}
\begin\{document\}
\begin\{frame\}
\begin\{tcbitemize\}[raster equal height=rows, enhanced,colback=blue!5,colframe=blue!20!gray,coltitle=yellow,]
\tcbitem[title=One,alert=<1>]
First Statement
\tcbitem[title=Two,hide=<-1>,alert=<2>]
Second Statement
\tcbitem[title=Three,hide=<-2>,alert=<3>]
Test
\tcbitem[title=Four,hide=<-3>,alert=<4>]
\begin\{equation*\}
\int\limits_{1}^{x} \frac{1}{t}~dt = \ln(x).
\end\{equation*\}
\tcbitem[title=Five,hide=<-4>,alert=<5>]
\includegraphics[width=1cm]{goldshade.png}
\tcbitem[title=Six,hide=<-5>,alert=<6>]
Test
\end\{tcbitemize\}
\end\{frame\}
\end\{document\}
\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcbitemize}[raster equal height=rows, enhanced, colback=blue!5, colframe=blue!20!gray, coltitle=yellow, beamer hidden/.style={invisible, interior hidden, colframe=blue!20!gray!15}, beamer alerted/.style={colframe=red!50!gray}, ]
\tcbitem \[title=One, alert=<1>\]
First Statement
\tcbitem \[title=Two, hide=<-1>, alert=<2>\]
Second Statement
\tcbitem \[title=Three, hide=<-2>, alert=<3>\]
Test
\tcbitem \[title=Four, hide=<-3>, alert=<4>\]
\begin{equation*}
\int\limits_{1}^{x} \frac{1}{t} \, dt = \ln(x).
\end{equation*}
\tcbitem \[title=Five, hide=<-4>, alert=<5>\]
\includegraphics[width=1cm]{goldshade.png}
\tcbitem \[title=Six, hide=<-5>, alert=<6>\]
Test
\end{tcbitemize}
\end{frame}
\end{document}
\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcbitemize}[raster equal height=rows, beamer,colback=blue!5,colframe=blue!20!gray,coltitle=yellow, beamer]
\item[title=One,alert=<1>]
First Statement
\item[title=Two,hide=<-1>,alert=<2>]
Second Statement
\item[title=Three,hide=<-2>,alert=<3>]
\end{tcbitemize}
\end{frame}

$\int_{1}^{x} \frac{1}{t} \, dt = \ln(x).$
\end{document}
\begin{equation*}
\int_{1}^{x} \frac{1}{t} \, dt = \ln(x).
\end{equation*}
The library is loaded by a package option or inside the preamble by:

\tcpuselibrary{vignette}

This also loads the \texttt{skins} library, see Section 10 on page 156, and the \texttt{fadings} library of \texttt{tikz} [22].

### 15.1 Vignette Drawing

\begin{tikzpicture}
\tcpvignette{}
\end{tikzpicture}

\begin{tikzpicture}
\node[draw,fill=blue!15!white] (A) {Test};
\tcpvignette{outside node=A,raised color=blue}
\end{tikzpicture}

\begin{tikzpicture}
\node[draw,fill=blue!15!white] (A) {Another Test};
\tcpvignette{size=3mm,outside node=A,\
  north style=red,east style=yellow,\
  south style=blue,west style=green}
\end{tikzpicture}

\begin{tikzpicture}
\node[inner sep=3mm,fill=red!75] (A) {Test};
\tcpvignette{over node=A,fade in}
\end{tikzpicture}

\tcpvignette can be used directly inside appropriate options keys for \texttt{tcolorbox}^\textsuperscript{P.12}. Note that options like \texttt{/tcb/underlay}^\textsuperscript{P.204} need \texttt{/tcb/enhanced}^\textsuperscript{P.218} or similar settings.
Mostly, convenient short cuts like `/tcb/underlay vignette` can be used to add a vignette to a `tcolorbox`. Here, `\tcbvignette` is used internally.

\begin{tcolorbox}  
[enhanced,size=small,sharp corners,  
colback=green!10,colframe=green!50!black,  
boxrule=1mm,titlerule=0mm,  
title=My title,center title,fonttitle=\bfseries,  
underlay vignette]  
This is a tcolorbox.  
\end{tcolorbox}

My title  
This is a tcolorbox.

### 15.2 Generic Geometry Settings

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/tcb/vig/xmin=⟨length⟩</code></td>
<td>(no default, initially 0pt) Sets the lower horizontal limit of a <code>\tcbvignette</code> → P.285.</td>
<td></td>
</tr>
<tr>
<td><code>/tcb/vig/xmax=⟨length⟩</code></td>
<td>(no default, initially 1cm) Sets the upper horizontal limit of a <code>\tcbvignette</code> → P.285.</td>
<td></td>
</tr>
<tr>
<td><code>/tcb/vig/ymin=⟨length⟩</code></td>
<td>(no default, initially 0pt) Sets the lower vertical limit of a <code>\tcbvignette</code> → P.285.</td>
<td></td>
</tr>
<tr>
<td><code>/tcb/vig/ymax=⟨length⟩</code></td>
<td>(no default, initially 1cm) Sets the upper vertical limit of a <code>\tcbvignette</code> → P.285.</td>
<td></td>
</tr>
<tr>
<td><code>/tcb/vig/lower left corner={coordinates}</code></td>
<td>(style, initially 0,0) Sets the lower left corner of a <code>\tcbvignette</code>. This style sets <code>/tcb/vig/xmin</code> and <code>/tcb/vig/ymin</code>.</td>
<td></td>
</tr>
<tr>
<td><code>/tcb/vig/upper right corner={coordinates}</code></td>
<td>(style, initially 1,1) Sets the upper right corner of a <code>\tcbvignette</code>. This style sets <code>/tcb/vig/xmax</code> and <code>/tcb/vig/ymax</code>.</td>
<td></td>
</tr>
<tr>
<td><code>/tcb/vig/inside node={name}</code></td>
<td>(style, initially unset) Places the <code>\tcbvignette</code> inside the node with the given <code>{name}</code>. The outer limits of the vignette are adapted to the node geometry.</td>
<td></td>
</tr>
</tbody>
</table>

\begin{tikzpicture}  
\fill [black!20] (0,0) rectangle (3,2);  
\path [pattern=checkerboard,pattern color=black!30]  
(0,0) rectangle (3,2);  
\tcbvignette{xmin=1cm,xmax=2.5cm,ymin=0.5cm,ymax=1.75cm}  
\end{tikzpicture}

\begin{tikzpicture}  
\node[minimum width=2cm,minimum height=1cm] (A) {Node A};  
\tcbvignette[inside node=A]  
\draw[very thick] (A.south west) rectangle (A.north east);  
\end{tikzpicture}

286
\begin{tikzpicture}
  \node[minimum width=2cm,minimum height=1cm] (A) {Node A};
  \tcbvignette{outside node=A}
  \draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}

\begin{tikzpicture}
  \node[minimum width=2cm,minimum height=1cm] (A) {Node A};
  \tcbvignette{over node offset=1mm,over node=A}
  \draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{north size=4mm}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{south size=4mm}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{east size=4mm}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{west size=4mm}
\end{tikzpicture}

\textbf{N 2016-04-22} \texttt{/tcb/vig/\texttt{outside \texttt{node}}=\langle \texttt{name} \rangle} \hspace{1cm} \text{(style, initially unset)}

Places the \texttt{\texttt{tcbvignette}} \textsuperscript{\texttt{P.285}} outside the node with the given \langle \texttt{name} \rangle. The inner limits of the \texttt{vignette} are adapted to the node geometry.

\begin{verbatim}
\begin{tikzpicture}
  \node[minimum width=2cm,minimum height=1cm] (A) {Node A};
  \tcbvignette{outside node=A}
  \draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}
\end{verbatim}

\textbf{N 2016-04-22} \texttt{/tcb/vig/\texttt{over \texttt{node}}=\langle \texttt{name} \rangle} \hspace{1cm} \text{(style, initially unset)}

Places the \texttt{\texttt{tcbvignette}} \textsuperscript{\texttt{P.285}} over the node with the given \langle \texttt{name} \rangle. The outer limits of the \texttt{vignette} are adapted to the node geometry, but are shifted to the outside by \texttt{/tcb/vig/over node offset}.

\begin{verbatim}
\begin{tikzpicture}
  \node[minimum width=2cm,minimum height=1cm] (A) {Node A};
  \tcbvignette{over node offset=1mm,over node=A}
  \draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}
\end{verbatim}

\textbf{N 2016-04-22} \texttt{/tcb/vig/\texttt{over \texttt{node \texttt{offset}}}=\langle \texttt{length} \rangle} \hspace{1cm} \text{(no default, initially 0.1mm)}

Determines the shift value for \texttt{/tcb/vig/over node}. Note that \texttt{/tcb/vig/over node offset} has to be set before \texttt{/tcb/vig/over node} is used.

\textbf{N 2016-04-22} \texttt{/tcb/vig/\texttt{north \texttt{size}}}=\langle \texttt{length} \rangle \hspace{1cm} \text{(no default, initially 2mm)}

Sets the thickness of the north \texttt{vignette} part.

\begin{verbatim}
\begin{tikzpicture}
  \tcbvignette{north size=4mm}
\end{tikzpicture}
\end{verbatim}

\textbf{N 2016-04-22} \texttt{/tcb/vig/\texttt{south \texttt{size}}}=\langle \texttt{length} \rangle \hspace{1cm} \text{(no default, initially 2mm)}

Sets the thickness of the south \texttt{vignette} part.

\begin{verbatim}
\begin{tikzpicture}
  \tcbvignette{south size=4mm}
\end{tikzpicture}
\end{verbatim}

\textbf{N 2016-04-22} \texttt{/tcb/vig/\texttt{east \texttt{size}}}=\langle \texttt{length} \rangle \hspace{1cm} \text{(no default, initially 2mm)}

Sets the thickness of the east \texttt{vignette} part.

\begin{verbatim}
\begin{tikzpicture}
  \tcbvignette{east size=4mm}
\end{tikzpicture}
\end{verbatim}

\textbf{N 2016-04-22} \texttt{/tcb/vig/\texttt{west \texttt{size}}}=\langle \texttt{length} \rangle \hspace{1cm} \text{(no default, initially 2mm)}

Sets the thickness of the west \texttt{vignette} part.

\begin{verbatim}
\begin{tikzpicture}
  \tcbvignette{west size=4mm}
\end{tikzpicture}
\end{verbatim}
15.3 Generic Color and Style Settings

Sets TikZ \{style\} options for the north \textit{vignette} part.

Sets TikZ \{style\} options for the south \textit{vignette} part.

Sets TikZ \{style\} options for the east \textit{vignette} part.
/tcb/vig/west style={\langle style\rangle} \hspace{6cm} \text{(no default, initially red!75!white)}

Sets TikZ \langle style\rangle options for the west \textit{vignette} part.

\begin{tikzpicture}
\tcbvignette{west style={preaction={fill=black!20},
pattern=checkerboard,
pattern color=black!30}}
\end{tikzpicture}

\section*{/tcb/vig/scope={\langle style\rangle}} \hspace{6cm} \text{(no default, initially empty)}

The four \textit{vignette} parts are drawn inside a TikZ \texttt{scope} environment which takes the given \langle style\rangle as option.

\begin{tikzpicture}
\tcbvignette{scope={transparency group,opacity=0.25}}
\end{tikzpicture}

/tcb/vig/raised color={\langle color\rangle} \hspace{6cm} \text{(no default)}

Creates a raised frame impression by setting the four style options /tcb/vig/north style \textsuperscript{P.288}, /tcb/vig/south style \textsuperscript{P.288}, /tcb/vig/east style \textsuperscript{P.288}, and /tcb/vig/west style to darkened and lightened variations of the given \langle color\rangle.

\begin{tikzpicture}
\tcbvignette{raised color=blue}
\end{tikzpicture}

/tcb/vig/lowered color={\langle color\rangle} \hspace{6cm} \text{(no default)}

Creates a lowered frame impression by setting the four style options /tcb/vig/north style \textsuperscript{P.288}, /tcb/vig/south style \textsuperscript{P.288}, /tcb/vig/east style \textsuperscript{P.288}, and /tcb/vig/west style to darkened and lightened variations of the given \langle color\rangle.

\begin{tikzpicture}
\tcbvignette{lowered color=green!75!black}
\end{tikzpicture}

/tcb/vig/color from={\langle inner\rangle} to {\langle outer\rangle} \hspace{6cm} \text{(no default)}

Sets the four style options /tcb/vig/north style \textsuperscript{P.288}, /tcb/vig/south style \textsuperscript{P.288}, /tcb/vig/east style \textsuperscript{P.288}, and /tcb/vig/west style such that the color shades from the \langle inner\rangle color to the \langle outer\rangle color.

\begin{tikzpicture}
\tcbvignette{color from=red to blue!50}
\end{tikzpicture}

/tcb/vig/base color={\langle color\rangle} \hspace{6cm} \text{(no default)}

Sets the base color for /tcb/vig/raised color, /tcb/vig/lowered color, /tcb/finish fading vignette \textsuperscript{P.296}. Typically, this value has not to be set directly.
Especially, if shadings or fadings are used, the drawn vignette graphs are displayed sometimes not as perfect as expected. Glitches and imperfections are very dependent on the previewer software. The \texttt{/tcb/vig/draw method} intends to give a choice of alternative drawing methods.

- \textbf{direct}: The vignette parts are drawn/filled by using a single TikZ graph. This is the preferred (and default) method for solid color graphs.
- \textbf{clipped}: The vignette parts are drawn somewhat oversized and are clipped to the intended region. In combination with shadings and fadings this seems to give a better/different optical result (depends on the previewer).

\begin{tikzpicture}
\tcbvignette[color from=red to yellow]
\end{tikzpicture}

\begin{tikzpicture}
\tcbvignette[color from=red to yellow,draw method=clipped]
\end{tikzpicture}

This option is a stopgap and may be changed or preferably removed in future.

### 15.4 Generic Fading Settings

The \texttt{fadings} library of \texttt{tikz} \cite{tikzlibraryfadings} is loaded automatically by the \texttt{vignette} library. Amongst others, the fadings \texttt{west}, \texttt{east}, \texttt{north}, and \texttt{south} are defined inside the \texttt{fadings} library.

The \texttt{vignette} library adds some more fadings called \texttt{semi west}, \texttt{semi east}, \texttt{semi north}, and \texttt{semi south}. These fadings are much \textit{weaker} than the normal fadings.

\begin{tikzpicture}
\fill [black!20] (0,0) rectangle (1,1);
\path [pattern=checkerboard,pattern color=black!30] (0,0) rectangle (1,1);
\fill [path fading=semi west,blue] (0,0) rectangle (1,1);
\end{tikzpicture}

\begin{center}
\textbf{Comparison of the Fadings}
\end{center}

<table>
<thead>
<tr>
<th>west</th>
<th>east</th>
</tr>
</thead>
<tbody>
<tr>
<td>north</td>
<td>south</td>
</tr>
<tr>
<td>semi west</td>
<td>semi east</td>
</tr>
<tr>
<td>semi north</td>
<td>semi south</td>
</tr>
</tbody>
</table>
Sets the four style options /tcb/vig/north style → P.288, /tcb/vig/south style → P.288, /tcb/vig/east style → P.288, and /tcb/vig/west style → P.289 such that the paths fade from outside to inside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{fade in=blue}
\end{tikzpicture}

Sets the four style options /tcb/vig/north style → P.288, /tcb/vig/south style → P.288, /tcb/vig/east style → P.288, and /tcb/vig/west style → P.289 such that the paths fade from inside to outside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{fade out=blue}
\end{tikzpicture}

Sets the four style options /tcb/vig/north style → P.288, /tcb/vig/south style → P.288, /tcb/vig/east style → P.288, and /tcb/vig/west style → P.289 such that the paths fade weak from outside to inside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{semi fade in=blue}
\end{tikzpicture}

Sets the four style options /tcb/vig/north style → P.288, /tcb/vig/south style → P.288, /tcb/vig/east style → P.288, and /tcb/vig/west style → P.289 such that the paths fade weak from inside to outside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{semi fade out=blue}
\end{tikzpicture}
It is possible to assign different fadings for each side of the vignette, if needed. Therefore, the fadings have to be applied individually with the four style options \texttt{/tcb/vig/north style} \textsuperscript{P.288}, \texttt{/tcb/vig/south style} \textsuperscript{P.288}, \texttt{/tcb/vig/east style} \textsuperscript{P.288}, and \texttt{/tcb/vig/west style} \textsuperscript{P.289}.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30] (-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{
    north style={blue,path fading=south},
    east style= {blue,path fading=semi west},
    south style={blue,path fading=semi north},
    west style= {blue,path fading=east}
}
\end{tikzpicture}

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30] (-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{
    north style={blue,path fading=west},
    east style = {blue,path fading=south},
    south style={red,path fading=east},
    west style= {red,path fading=north}
}
\end{tikzpicture}
15.5 Vignette as Underlay

\[\text{/tcb/underlay vignette=}\{\langle \text{options} \rangle \}\] (style, no default)

This puts a \texttt{\tcbvignette} \[\text{P.285}\] with the given \langle \text{options} \rangle as \texttt{/tcb/underlay} \[\text{P.204}\] to a \texttt{tcolorbox} \[\text{P.12}\]. The dimensions of the \texttt{vignette} are matched to the dimensions of the \texttt{tcolorbox} \[\text{P.12}\]. For example, \texttt{/tcb/leftrule} \[\text{P.35}\] is used as \texttt{/tcb/vig/west size} \[\text{P.287}\]. Also, \texttt{/tcb/colframe} \[\text{P.27}\] is used as \texttt{/tcb/vig/raised color} \[\text{P.289}\]. For a \texttt{/tcb/breakable} \[\text{P.390}\] \texttt{tcolorbox}, the \texttt{vignette} is also been broken. Alternatively, \texttt{\tcbvignette} \[\text{P.285}\] could be used directly inside an \texttt{/tcb/underlay} \[\text{P.204}\] with appropriate settings.

\begin{tcolorbox}[enhanced,size=small,sharp corners, 
  colback=green!10,colframe=green!50!black, 
  boxrule=2mm,titlerule=0mm, 
  title=My title,center title,fonttitle=\bfseries, 
  underlay vignette] 
  This is a tcolorbox. 
\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,arc=0pt, 
  colback=blue!10,colframe=blue,boxrule=2mm, 
  underlay vignette={size=1.5mm}] 
  This is a tcolorbox. 
\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,sharp corners, 
  colframe=red,interior hidden,boxrule=2mm, 
  colupper=white,center upper,fontupper=\bfseries, 
  underlay vignette] 
  This is a tcolorbox. 
\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,sharp corners, 
  colback=red!50!yellow,frame hidden,boxrule=2mm, 
  underlay vignette={color from=red!50!yellow to white, 
  draw method=clipped,size=2.1mm}] 
  This is a tcolorbox. 
\end{tcolorbox}

\begin{tcolorbox}[enhanced,sharp corners,colback=red!10,colframe=red] 
  \{Test\} 
\end{tcolorbox}

\begin{tcolorbox}[enhanced,sharp corners,colback=red!10,colframe=red, 
  underlay vignette] 
  \{Test\} 
\end{tcolorbox}
This is a special style derived from \texttt{/tcb/underlay vignette}→P.293, where the frame color is shaded to create a soft raised frame impression.

```latex
\begin{tcolorbox}[enhanced,sharp corners, 
colback=green!10, 
colframe=green!50!black, 
size=small,boxrule=2mm,titlerule=0mm, 
title=My title,center title,fonttitle=\bfseries, 
underlay raised shading vignette] 
This is a tcolorbox. 
\end{tcolorbox}
```

This style gives a similar effect as \texttt{/tcb/underlay raised shading vignette}, but a path fading is used here. Different optical impression are very previewer-dependent.

```latex
\begin{tcolorbox}[enhanced,sharp corners, 
colback=green!10, 
colframe=green!50!black, 
size=small,boxrule=2mm,titlerule=0mm, 
title=My title,center title,fonttitle=\bfseries, 
underlay raised fading vignette] 
This is a tcolorbox. 
\end{tcolorbox}
```

This is a special style derived from \texttt{/tcb/underlay vignette}→P.293, where the frame color is shaded into the interior color.

```latex
\begin{tcolorbox}[enhanced,sharp corners,frame hidden, 
colback=green!10, 
colframe=green!50!black, 
size=small,boxrule=2mm,titlerule=0mm, 
underlay shade in vignette] 
This is a tcolorbox. 
\end{tcolorbox}
```
15.6 Vignette as Finish

\begin{tcolorbox}
[enhanced,size=small,
colback=green!10,colframe=green!50!black,
boxrule=0.5mm,titlerule=0mm,
title=My title,center title,fonttitle=\bfseries,
finish vignette={size=1mm}]
This is a tcolorbox.
\end{tcolorbox}

\tcbincludegraphics[blankest,width=3cm,
finish vignette={size=3mm}]{pink_marble.png}

This puts a \texttt{/tcbvignette} \textsuperscript{P.285} with the given \texttt{(options)} as \texttt{/tcb/finish} \textsuperscript{P.206} to a \texttt{tcolorbox} \textsuperscript{P.12}. The default style settings create a raised frame impression by drawing black and white color parts with reduced opacity.

\begin{tcolorbox}
[enhanced,size=small,
colback=green!10,colframe=green!50!black,
boxrule=0.5mm,titlerule=0mm,
title=My title,center title,fonttitle=\bfseries,
finish raised fading vignette={size=1mm}]
This is a tcolorbox.
\end{tcolorbox}

\tcbincludegraphics[blankest,width=3cm,
finish raised fading vignette={size=3mm}]{pink_marble.png}

\texttt{/tcb/finish raised fading vignette=\{\textit{(options)}\}} (style, no default)

This puts a \texttt{/tcbvignette} \textsuperscript{P.285} with the given \texttt{(options)} as \texttt{/tcb/finish} \textsuperscript{P.206} to a \texttt{tcolorbox} \textsuperscript{P.12}. The default style settings create a soft raised frame impression by drawing fading black and white color parts.

\begin{tcolorbox}
[enhanced,size=small,
colback=green!10,colframe=green!50!black,
boxrule=0.5mm,titlerule=0mm,
title=My title,center title,fonttitle=\bfseries,
finish raised fading vignette={size=1mm}]
This is a tcolorbox.
\end{tcolorbox}

\tcbincludegraphics[blankest,width=3cm,
finish raised fading vignette={size=3mm}]{pink_marble.png}
This puts a `\tcboxvignette` with the given \langle options \rangle as `\finish` to a \tcbox. The default style settings fade the box into white from inside to outside. Note that `\tcb/vig/over node` is used here. `\tcb/vig/over node offset` can be adapted to overlap the box more or less. The fade color can be set using `\tcb/vig/base color`.

\begin{tcolorbox}[enhanced,size=small, 
colback=green!10,colframe=green!50!black, 
boxrule=0.5mm,titlerule=0mm, 
title=My title,center title,fonttitle=\bfseries, 
finish fading vignette={size=2mm}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[colback=blue!50!black,size=small, 
title=Example] 
\tcbincludegraphics[blankest,width=3cm, 
finish fading vignette={size=3mm}]{pink_marble.png} 
\end{tcolorbox}
A

B

C

D

E

F

G

H1

H2

I1

I2

J1

J2

K

L1

L2
The library is loaded by a package option or inside the preamble by:

```latex
\cbuselibrary{raster}
```

### 16.1 Concept of Rasters

A *raster* is used to align several colored boxes in a regular way. It can be seen as a far related counterpart to the *matrix* construct of TikZ, but it differs in many aspects.

In principle, `tcolorbox`es are arranged in rows and columns when put inside a `tcbraster` environment. The boxes are fluently added to the raster like adding text to a paragraph. Especially, line/row breaks are done automatically and one cannot end a line/row ahead of schedule. Further, a *raster* is not restricted to a single page but may break into an arbitrary series of pages.

---

**Box #1**


**Box #2**


**Box #3**


**Box #4**


---

```
/tcb/raster before skip
/tcb/raster row skip
/tcb/raster left skip
/tcb/raster after skip
/tcb/raster width
/tcb/raster height
/tcb/raster column skip
/tcb/raster right skip
```

298


Nine Boxes.
16.2 Macros of the Library

\begin{tcbraster}[(options)]
\begin{environment content}
\end{tcbraster}

A raster arranges enclosed boxes in a regular way, mainly into rows and columns. The \textit{(options)} are used to control the raster parameters and to set the properties for the enclosed boxes.

- The \textit{raster} is only allowed to contain a series of \texttt{tcolorbox} \textit{P.12} environments or derived constructs. With some small restrictions, boxes created with \texttt{tcboxfit} \textit{P.439} can also be added. Boxes created with \texttt{tcbox} \textit{P.14} are not reasonable here, but may be used to a certain degree.
- Do not add anything else between the boxes inside the raster with exception of whitespace. Especially, do not use \texttt{\\} or \texttt{\par} to end a row; row breaks are done automatically.
- The boxes inside a raster are numbered automatically. \texttt{\thetcbrasternum} may be used inside a box to access this number. The \LaTeX\ counter \texttt{tcbrastercolumn} holds the current column, the counter \texttt{tcbrasterrow} holds the current row, and the counter \texttt{tcbrasternum} holds the current box number.

\begin{tcbraster}
[raster columns=3, raster equal height, size=small,colframe=red!50!black,colback=red!10!white,colbacktitle=red!50!white, title={Box \thetcbrasternum}]
\begin{tcolorbox}
First box
\end{tcolorbox}
\begin{tcolorbox}
Second box
\end{tcolorbox}
\begin{tcolorbox}
This is a box with a second line
\end{tcolorbox}
\begin{tcolorbox}
Another box
\end{tcolorbox}
\begin{tcolorbox}
A box again
\end{tcolorbox}
\end{tcbraster}

\begin{tcbraster}
[raster columns=2, raster equal height=rows, size=small,colframe=red!50!black,colback=red!10!white,colbacktitle=red!50!white, title={Box \thetcbrasternum}]
\begin{tcolorbox}
First box
\end{tcolorbox}
\begin{tcolorbox}
Second box
\end{tcolorbox}
\begin{tcolorbox}
This is a box with a second line
\end{tcolorbox}
\begin{tcolorbox}
Another box
\end{tcolorbox}
\begin{tcolorbox}
A box again
\end{tcolorbox}
\end{tcbraster}
This is a special case of a `tcbraster` with the given `options`.
- Here, the enclosed boxes are created using \texttt{tcbitem}.
- There has to be at least one \texttt{tcbitem}.
- One cannot use anything else than \texttt{tcbitem} to add something to the \textit{raster}.

This leads to a very compact syntax.

\begin{tcbitemize}
\[raster\ columns=2, \text{raster equal height=rows,} \size=\text{small}, \text{colframe=red!50!black}, \text{colback=red!10!white}, \text{colbacktitle=red!50!white,} \]
\texttt{tcbitem} First box \hfill \texttt{tcbitem} Second box
\texttt{tcbitem} This is a box with a second line \hfill \texttt{tcbitem}[\text{colback=yellow, colbacktitle=yellow!50!black}] Another box
\texttt{tcbitem} A box again
\end{tcbitemize}

Box # 1
First box

Box # 2
Second box

Box # 3
This is a box with a second line

Box # 4
Another box

Box # 5
A box again

\texttt{tcbitemize} has more restrictions than \texttt{tcbraster}. Especially, the \texttt{/tcb/capture} mode has to be \texttt{minipage}. For example, \texttt{/tcb/fit} cannot be used safely. If \texttt{/tcb/fit} should be used, turn over to \texttt{tcbraster}.

\texttt{tcbitem} [\textit{options}]

Used inside \texttt{tcbitemize} to create a new \texttt{tcolorbox} with the given \textit{options}. 

301
This is a convenience environment which combines a `tcolorbox` with an embedded `tcbraster`. The `<box options>` are given to the outer `tcolorbox`, while the `<raster options>` are given to the embedded `tcbraster`. This environment is especially useful for rasters inside rasters.

\begin{tcboxedraster}[
  <raster options>
  \begin{tcbraster}
    \begin{tcolorbox}
      \begin{tcolorbox}
        \begin{tcolorbox}
          \begin{tcolorbox}
            \begin{tcolorbox}
              \begin{tcolorbox}
                \begin{tcolorbox}
                  \begin{tcolorbox}
                    \begin{tcolorbox}
                      \begin{tcolorbox}
                        \begin{tcolorbox}
                          \begin{tcolorbox}
                            \begin{tcolorbox}
                              \begin{tcolorbox}
                                \begin{tcolorbox}
                                  \begin{tcolorbox}
                                    \begin{tcolorbox}
                                      \begin{tcolorbox}
                                        \begin{tcolorbox}
                                          \begin{tcolorbox}
                                            \begin{tcolorbox}
                                              \begin{tcolorbox}
                                                \begin{tcolorbox}
                                                  \begin{tcolorbox}
                                                    \begin{tcolorbox}
                                                      \begin{tcolorbox}
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                                                          \begin{tcolorbox}
                                                            \begin{tcolorbox}
                                                              \begin{tcolorbox}
                                                                \begin{tcolorbox}
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                                                                    \begin{tcolorbox}
                                                                      \begin{tcolorbox}
                                                                        \begin{tcolorbox}
                                                                          \begin{tcolorbox}
                                                                            \begin{tcolorbox}
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                                                                                \begin{tcolorbox}
                                                                                  \begin{tcolorbox}
                                                                                    \begin{tcolorbox}
                                                                                  \end{tcolorbox}
                                                                            \end{tcolorbox}
                                                                        \end{tcolorbox}
                                                                    \end{tcolorbox}
                                                                  \end{tcolorbox}
                                                                 \end{tcolorbox}
                                                               \end{tcolorbox}
                                                              \end{tcolorbox}
                                                            \end{tcolorbox}
                                                          \end{tcolorbox}
                                                        \end{tcolorbox}
                                                      \end{tcolorbox}
                                                    \end{tcolorbox}
                                                  \end{tcolorbox}
                                                \end{tcolorbox}
                                              \end{tcolorbox}
                                            \end{tcolorbox}
                                          \end{tcolorbox}
                                        \end{tcolorbox}
                                      \end{tcolorbox}
                                    \end{tcolorbox}
                                  \end{tcolorbox}
                                \end{tcolorbox}
                              \end{tcolorbox}
                            \end{tcolorbox}
                          \end{tcolorbox}
                        \end{tcolorbox}
                      \end{tcolorbox}
                    \end{tcolorbox}
                  \end{tcolorbox}
                \end{tcolorbox}
              \end{tcolorbox}
            \end{tcolorbox}
          \end{tcolorbox}
        \end{tcolorbox}
      \end{tcolorbox}
    \end{tcolorbox}
  \end{tcbraster}
\end{tcboxedraster}
This is a convenience environment which combines a \texttt{tcolorbox}$^{\text{P.12}}$ with an embedded \texttt{tcbitemize}$^{\text{P.301}}$. The \texttt{box options} are given to the outer \texttt{tcolorbox}$^{\text{P.12}}$, while the \texttt{raster options} are given to the embedded \texttt{tcbitemize}$^{\text{P.301}}$. This environment is especially useful for rasters inside rasters.

\begin{tcboxeditemize}[raster columns=3, raster equal height, size=small,colframe=red!50!black,colback=red!10!white,colbacktitle=red!50!white, title={Box \# \texttt{\thetcbrasternum}}]
\begin{tcboxitemize}
\item This is a box\begin{tcboxitemize}
\item First box
\end{tcboxitemize}
\item Second box
\item This is a box\begin{tcboxitemize}
\item Another box
\end{tcboxitemize}
\item A box again
\end{tcboxeditemize}
\end{tcboxeditemize}

Boxed Itemize

<table>
<thead>
<tr>
<th>Box # 1</th>
<th>Box # 2</th>
<th>Box # 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>First box</td>
<td>Second box</td>
<td>This is a box with a second line</td>
</tr>
<tr>
<td>Box # 4</td>
<td>Box # 5</td>
<td></td>
</tr>
<tr>
<td>Another box</td>
<td>A box again</td>
<td></td>
</tr>
</tbody>
</table>

303
16.3 Option Keys of the Library

\[ \texttt{/tcb/raster columns=\{number\}} \] (no default, initially 2)

Sets the \{number\} of columns for a \textit{raster}.

\begin{verbatim}
\begin{tcbitemize}[raster columns=3, 
  size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One 
  \tcbitem Two 
  \tcbitem Three 
  \tcbitem Four 
\end{tcbitemize}
\end{verbatim}

\begin{verbatim}
\begin{tcbitemize}[raster columns=4, 
  size=small,colframe=blue!50!black,colback=blue!10!white]
  \tcbitem One 
  \tcbitem Two 
  \tcbitem Three 
  \tcbitem Four 
\end{tcbitemize}
\end{verbatim}

\[ \texttt{/tcb/raster rows=\{number\}} \] (no default, initially 2)

Sets the \{number\} of rows for a \textit{raster}. Note that this is only relevant in connection with setting \texttt{/tcb/raster height} \textsuperscript{P.306} to a value greater than 0pt. Then, it defines the number of rows per given height.

\[ \texttt{/tcb/raster width=\{length\}} \] (no default, initially \texttt{\linewidth})

Sets the total raster width to the given \{length\}. \texttt{/tcb/raster left skip} \textsuperscript{P.307} and \texttt{/tcb/raster right skip} \textsuperscript{P.307} are part of the total width. Note that both skip values are not changed by this option.

\begin{verbatim}
\begin{tcbitemize}[raster width=\linewidth/2, 
  size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One 
  \tcbitem Two 
  \tcbitem Three 
  \tcbitem Four 
\end{tcbitemize}
\end{verbatim}
/tcb/raster width flush left=⟨length⟩ (style, no default)

Sets the total /tcb/raster width \textit{P.304} to \textit{\linewidth} and adapts /tcb/raster left skip \textit{P.307} and /tcb/raster right skip \textit{P.307} to place the raster on the left hand side with a visual width of the given \textit{⟨length⟩}.

\begin{tcbitemize}[raster width flush left=\textit{\linewidth}/2, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

One Two
Three Four

Note that the results of /tcb/raster width \textit{P.304} and /tcb/raster width flush left look identical, but differ on technical side since the later always fills the available \textit{\linewidth}.

/tcb/raster width center=⟨length⟩ (style, no default)

Sets the total /tcb/raster width \textit{P.304} to \textit{\linewidth} and adapts /tcb/raster left skip \textit{P.307} and /tcb/raster right skip \textit{P.307} to center the raster with a visual width of the given \textit{⟨length⟩}.

\begin{tcbitemize}[raster width center=\textit{\linewidth}/2, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

One Two
Three Four

/tcb/raster width flush right=⟨length⟩ (style, no default)

Sets the total /tcb/raster width \textit{P.304} to \textit{\linewidth} and adapts /tcb/raster left skip \textit{P.307} and /tcb/raster right skip \textit{P.307} to place the raster on the right hand side with a visual width of the given \textit{⟨length⟩}.

\begin{tcbitemize}[raster width flush right=\textit{\linewidth}/2, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

One Two
Three Four
/tcb/raster height=(length) (no default, initially 0pt)

Sets the raster height per /tcb/raster rows→P.304 to the given ⟨length⟩. This forces an appropriate height for the enclosed boxes. /tcb/raster before skip and /tcb/raster after skip are not part of this calculation. If the ⟨length⟩ is set to 0pt, this feature is deactivated.

\begin{tcbitemize}[raster height=4cm, raster rows=2, size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem Two \tcbitem[enhanced, finish={\draw[blue,very thick,<->] (frame.south) -- node[right,pos=.75]{4cm} +(0,4); }]
  Three
  \tcbitem Four
  \tcbitem Five
\end{tcbitemize}

/tcb/raster before skip=(glue) (no default, initially 2mm)

Space of the given ⟨glue⟩ is inserted vertically before the raster. This space is discardable.

/tcb/raster after skip=(glue) (no default, initially 2mm)

Space of the given ⟨glue⟩ is inserted vertically after the raster. This space is discardable.

/tcb/raster equal skip=(length) (style, no default)

Shortcut to set /tcb/raster before skip, /tcb/raster after skip, /tcb/raster column skip→P.307, and /tcb/raster row skip→P.307 to the same ⟨length⟩ value.

\begin{tcbitemize}[raster equal skip=4mm, size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}
Space of the given \( \texttt{length} \) is inserted horizontally left of the \textit{raster}.

\begin{tcbitemize}[raster left skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

Space of the given \( \texttt{length} \) is inserted horizontally right of the \textit{raster}.

\begin{tcbitemize}[raster right skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

Space of the given \( \texttt{length} \) is inserted horizontally between the columns.

\begin{tcbitemize}[raster column skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

Space of the given \( \texttt{length} \) is inserted vertically between the rows.

\begin{tcbitemize}[raster row skip=0pt, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}
\begin{tcbitemize}[raster halign=center, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\end{tcbitemize}

One Two Three

\begin{tcbitemize}[raster valign=top, raster columns=3, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem \Huge One
\tcbitem \Large Two
\tcbitem Three
\end{tcbitemize}

\begin{tcbitemize}[raster valign=center, raster columns=3, size=small,colframe=blue!50!black,colback=blue!10!white]
\tcbitem \Huge One
\tcbitem \Large Two
\tcbitem Three
\end{tcbitemize}

\begin{tcbitemize}[raster valign=bottom, raster columns=3, size=small,colframe=green!50!black,colback=green!10!white]
\tcbitem \Huge One
\tcbitem \Large Two
\tcbitem Three
\end{tcbitemize}
/tcb/raster equal height=(type)  
(default all, initially none)

Puts the enclosed boxes into a common /tcb/equal height group \( \text{P.61} \). The \( \langle \text{id} \rangle \) of the equal height group is chosen automatically, but it may be set manually by /tcb/raster equal height group. Also see /tcb/minimum for current equal height group \( \text{P.62} \).

Feasible values for \( \langle \text{type} \rangle \) are:
- \text{none}: no equal height setting,
- \text{rows}: all boxes in a row are set to equal height,
- \text{all}: all boxes in the raster are set to equal height.

Note that you have to compile twice to see changes.

\begin{tcbitemize}[raster equal height=rows, 
size=small,colframe=red!50!black,colback=red!10!white] 
\tcbitem One 
\tcbitem \Huge Two 
\tcbitem Three 
\tcbitem Four 
\end{tcbitemize}

\begin{tcbitemize}[raster equal height, 
size=small,colframe=red!50!black,colback=red!10!white] 
\tcbitem One 
\tcbitem \Huge Two 
\tcbitem Three 
\tcbitem Four 
\end{tcbitemize}

\begin{tcbitemize}[raster equal height,raster equal height group=raster-manual-id] 
\tcbitem One 
\tcbitem \Huge Two 
\end{tcbitemize}

\begin{tcbitemize}[raster equal height, 
raster equal height group=raster-manual-id] 
\tcbitem One 
\tcbitem \Huge Two 
\end{tcbitemize}

/tcb/raster equal height group=(id)  
(no default)

Overwrites the automatically chosen id with the given \( \langle \text{id} \rangle \). If this is used to share a common height between the raster and another raster or box, the /tcb/raster equal height option should be set to \text{all}.

\begin{tcolorbox}[equal height group=raster-manual-id] 
A single box 
\end{tcolorbox}

\begin{tcbitemize}[raster equal height,raster equal height group=raster-manual-id] 
\tcbitem One 
\tcbitem \Huge Two 
\end{tcbitemize}

A single box

\begin{tcbitemize}[raster equal height, 
raster equal height group=raster-manual-id] 
\tcbitem One 
\tcbitem \Huge Two 
\end{tcbitemize}
Enforces the raster size computations onto the enclosed boxes. If set to \texttt{false}, individual settings can be used (for the better or worse).

\begin{tcbitemize}[raster force size=false, raster halign=center, size=small, colframe=red!50!black, colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem[add to width=-3cm] Three
\tcbitem[add to width=-3cm] Four
\tcbitem[add to width=-3cm] Five
\tcbitem[add to width=3cm] Six
\end{tcbitemize}

\begin{tcbitemize}
\item One
\item Two
\item Three
\item Four
\item Five
\item Six
\end{tcbitemize}

Sets all raster settings back to their default values. Note that \texttt{/tcb/reset} \texttt{P.112} does not execute this option. Style settings like \texttt{/tcb/raster odd column} etc. are not touched by \texttt{/tcb/raster reset}.

16.4 Adding Styles for Specific Boxes

The following styles can be defined to address certain boxes inside a \textit{raster}. Note that such style definitions are not removed by \texttt{/tcb/reset} \texttt{P.112} or \texttt{/tcb/raster reset}. The style definitions are used in the order given below.

\texttt{/tcb/raster every box} (style)

This style is used for every box.

\texttt{/tcb/raster odd column} (style)

This style is used for every box in an odd column.

\begin{tcbitemize}[size=small, colframe=red!50!black, colback=red!10!white, raster odd column/.style={colframe=blue!50!black, colback=blue!10!white}]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

\begin{tcbitemize}
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

\texttt{/tcb/raster even column} (style)

This style is used for every box in an even column.

\texttt{/tcb/raster column n} (style)

This style is used for every box in the n-th column. n has to be replaced by a number.

\texttt{/tcb/raster odd row} (style)

This style is used for every box in an odd row.
This style is used for every box in an even row.

This style is used for every box in the \textit{m}-th row. \textit{m} has to be replaced by a number.

\begin{tcbitemize}[size=small,colframe=red!50!black,colback=red!10!white, raster row 2/.style={colframe=blue!50!black,colback=blue!10!white}]
\tcitem One
\tcitem Two
\tcitem Three
\tcitem Four
\end{tcbitemize}

This style is used for every box with an odd number.

This style is used for every box with an even number.

\begin{tcbitemize}[size=small,colframe=red!50!black,colback=red!10!white, raster columns=3, raster even number/.style={colframe=blue!50!black,colback=blue!10!white}]
\tcitem One
\tcitem Two
\tcitem Three
\tcitem Four
\tcitem Five
\tcitem Six
\end{tcbitemize}

This style is used for the box in the \textit{m}-th row and \textit{n}-th column. \textit{m} and \textit{n} have to be replaced by numbers.

This style is used for the box with number \textit{n}. \textit{n} has to be replaced by a number.
16.5 Combining Columns or Rows

\texttt{/tcb/raster multicolumn=\langle number \rangle} \hspace{2cm} (no default, initially unset)

This option has to be set inside the option list of a \texttt{tcolorbox} \hspace{0.5cm} \textsuperscript{P. 12} inside a \texttt{tcbraster} \hspace{0.5cm} \textsuperscript{P. 300} or inside \texttt{tcbitem} \hspace{0.5cm} \textsuperscript{P. 301} inside \texttt{tcbitemize} \hspace{0.5cm} \textsuperscript{P. 301}. It merges the given \langle number \rangle of boxes into one single box on the same line. The resulting box gets the \texttt{\thetcbrasternum} of the first box. If there are not enough boxes available on the current line, this option is ignored and a warning is given.

\begin{tcbitemize}
\item \texttt{raster equal height=rows,raster columns=3,}
\item \texttt{title=\thetcbrasternum,}
\item \texttt{colframe=red!50!black, colback=red!10!white}
\item \texttt{multicolumn=1}
\item \texttt{tcbitem}
\item \texttt{tcbitem}
\item \texttt{tcbitem[colframe=blue!50!black, colback=blue!10!white, raster multicolumn=1]}
\item \texttt{multicolumn=2}
\item \texttt{tcbitem}
\item \texttt{tcbitem[colframe=blue!50!black, colback=blue!10!white, raster multicolumn=2]}
\item \texttt{multicolumn=2}
\item \texttt{tcbitem}
\item \texttt{tcbitem[colframe=blue!50!black, colback=blue!10!white, raster multicolumn=3]}
\item \texttt{multicolumn=2}
\end{tcbitemize}
/tcb/raster multirow\{number\} \hspace{1cm} (no default, initially unset)

This option has to be set inside the option list of a \texttt{tcolorbox}$\rightarrow$P.12 inside a \texttt{tcbraster}$\rightarrow$P.300 or inside \texttt{\tcbitem}$\rightarrow$P.301 inside \texttt{tcbitemize}$\rightarrow$P.301. This option not really merges boxes, but simply sizes the current box to fit the space of \langle\textit{number}\rangle\hspace{1cm}rows.

\noindent /tcb/raster multirow needs /tcb/raster height $\rightarrow$P.306 to be set. How to achieve a similar result for boxes without fixed /tcb/raster height $\rightarrow$P.306 is shown afterwards.

\begin{tcbitemize}[raster rows=3,raster columns=3,raster height=6cm,\noindent raster every box/.style={colframe=red!50!black,colback=red!10!white}]
\tcbitem
\tcbitem
\tcbitem
\tcbitem\[colframe=blue!50!black,colback=blue!10!white,raster multirow=2\]
\tcbitem\[raster multicolumn=2,raster multirow=2,blankest\]
\begin{tcbitemize}[raster rows=2,raster columns=2,raster height=\texttt{tcbtextheight}]
\tcbitem
\tcbitem
\tcbitem
\tcbitem
\end{tcbitemize}
\end{tcbitemize}

\begin{tcbitemize}[raster rows=3,raster columns=3,raster height=6cm,\noindent raster every box/.style={colframe=red!50!black,colback=red!10!white}]
\tcbitem
\tcbitem
\tcbitem
\tcbitem\[colframe=blue!50!black,colback=blue!10!white,raster multirow=2\]
\tcbitem\[raster multicolumn=2,raster multirow=2,blankest\]
\begin{tcbitemize}[raster rows=2,raster columns=2,raster height=\texttt{tcbtextheight}]
\tcbitem
\tcbitem
\tcbitem
\tcbitem
\end{tcbitemize}
\end{tcbitemize}
For rasters without fixed /tcb/raster height → P.306, /tcb/raster multirow → P.313 cannot be used. Note that \tcbtextheight → P.153 also cannot be used like in the previous example.

But, with combination of /tcb/raster equal height → P.309 and /tcb/space to → P.59, a similar effect can be created:

\begin{tcbitemize}[raster columns=3,raster equal height=rows, raster every box/.style={colframe=red!50!black,colback=red!10!white}]
  \tcbitem
  \tcbitem
  \tcbitem[colframe=blue!50!black,colback=blue!10!white]
  \lipsum[2]
  \tcbitem[raster multicolumn=2,blankest,space to=\myspace]
  \begin{tcbitemize}[raster columns=2]
    \tcbitem
    \tcbitem
    \tcbitem[height=\myspace]
    \tcbitem[height=\myspace]
  \end{tcbitemize}
\end{tcbitemize}
16.6 Rasters inside Rasters

A raster inside a raster cannot be used directly, because a raster can only contain a \texttt{tcolorbox} or something derived from a \texttt{tcolorbox}. So, a raster can be put inside a \texttt{tcolorbox} inside a raster.

Some examples for such constructions can be found at \texttt{tcboxedraster} \textsuperscript{P.302}, \texttt{tcb/raster multicolumn} \textsuperscript{P.312}, \texttt{tcb/raster multirow} \textsuperscript{P.313}.

16.6.1 Raster Setup

The intermediating \texttt{tcolorbox} \textsuperscript{P.12} can be made invisible by using \texttt{tcb/blankest} \textsuperscript{P.253}.

\begin{tcbraster}[raster equal height=rows, \raster every box/.style={colframe=red!50!black, colback=red!10!white}]
\begin{tcolorbox}[blankest]
\begin{tcbraster}[raster columns=1] 
\begin{tcolorbox}One\end{tcolorbox} 
\begin{tcolorbox}Two\end{tcolorbox} 
\end{tcbraster} 
\end{tcolorbox} 
\begin{tcolorbox}raster+tcolorbox+raster\end{tcolorbox} 
\end{tcbraster}

\begin{tcbraster}[raster equal height=rows, \raster every box/.style={colframe=red!50!black, colback=red!10!white}]
\begin{tcboxedraster}[raster columns=1]{blankest}
\begin{tcolorbox}One\end{tcolorbox} 
\begin{tcolorbox}Two\end{tcolorbox} 
\end{tcboxedraster} 
\begin{tcolorbox}raster+tcboxedraster\end{tcolorbox} 
\end{tcbraster}

\begin{tcbitemize}[raster equal height=rows, \raster every box/.style={colframe=red!50!black, colback=red!10!white}]
\tcbitem[blankest]
\begin{tcbitemize}[raster columns=1] 
\tcbitem One 
\tcbitem Two 
\end{tcbitemize} 
\tcbitem \tcbitemize+tcbitem+tcbitemize 
\end{tcbitemize}

One \hspace{1cm} Two

raster+tcolorbox+raster

raster+tcboxedraster

tcbitemize+tcbitem+tcbitemize
### 16.6.2 Placing Spaces

If the heights of boxes inside staggered rasters should be matched, the space has to be distributed accordingly.

- For fixed height boxes/rasters using `/tcb/raster height`\(^{\text{P.306}}\), the height of boxes is available by `/tcbtextheight`\(^{\text{P.155}}\). This can be used to size deeper layered boxes/rasters.
- For boxes/rasters layed out using `/tcb/raster equal height`\(^{\text{P.309}}\), space can be distributed by `/tcb/space to`\(^{\text{P.59}}\). It can take several compilations until all spaces are distributed correctly.

```latex
\begin{tcbitemize}[raster rows=2,raster height=6cm,
  raster every box/.style={colframe=red!50!black,colback=red!10!white}]
  \tcbitem[blankest]
  \begin{tcbitemize}[raster columns=1,raster rows=2,raster height=\tcbtextheight]
    \tcbitem One
    \tcbitem Two
  \end{tcbitemize}
  \tcbitem This is a fixed height box.
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}
```

<table>
<thead>
<tr>
<th>One</th>
<th>This is a fixed height box.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two</td>
<td></td>
</tr>
<tr>
<td>Three</td>
<td></td>
</tr>
<tr>
<td>Four</td>
<td></td>
</tr>
</tbody>
</table>
This is an example with fixed height boxes.
This box will adapt its height.

One

This is a flexible height box.

One

This box will adapt its height.

17 Libraries \texttt{listings}, \texttt{listingsutf8}, and \texttt{minted}

17.1 Loading the Libraries

In contrast to other \texttt{tcolorbox} libraries, the libraries \texttt{listings}, \texttt{listingsutf8}, and \texttt{minted} are concurrent in the sense that they all do the same thing, i.e. displaying listings with or without typesetting the listing in LaTeX parallel. The difference is the underlying LaTeX package which does the core job for displaying a listing. So, typically, you need just one of these libraries. If you do not have a clue which one of them you should use and you are using \texttt{pdflatex}, you should take \texttt{listingsutf8}. If you are using \texttt{xelatex} or \texttt{lualatex}, you should take \texttt{listings} as \texttt{xelatex} and \texttt{lualatex} are not compatible with \texttt{listingsutf8}.

The order in which the libraries are included influences the default settings and the \texttt{/tcb/reset} → P.112 behavior. The settings of a later loaded library overwrite the settings of a previous loaded library. A library is never loaded twice.

17.1.1 Loading \texttt{listings}

This library uses the package \texttt{listings} [6] to typeset listings. It is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{listings}
\end{verbatim}

This also loads the package \texttt{listings} [6].

The \texttt{/tcb/listing engine} → P.332 is set to \texttt{listings} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{verbatim}
\tcbset{listing engine=listings}
\end{verbatim}

17.1.2 Loading \texttt{listingsutf8}

This library is not needed (and troublesome) when using XeLaTeX or LuaLaTeX. Therefore, loading this library is automatically replaced by loading \texttt{listings} only, if pdfLaTeX is not used.

To extend \texttt{listings} for UTF-8 encoded sources, you can use the support from the package \texttt{listingsutf8} [11] by loading the library variant \texttt{listingsutf8}.

\begin{verbatim}
\tcbuselibrary{listingsutf8}
\tcbset{listing utf8=latin1} % optional; 'latin1' is the default.
\end{verbatim}

This also loads the library \texttt{listings} and the packages \texttt{listings} [6] and \texttt{listingsutf8} [11].

The \texttt{/tcb/listing engine} → P.332 is set to \texttt{listings} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{verbatim}
\tcbset{listing engine=listings}
\end{verbatim}
17.1.3 Loading \minted

This library uses the package \minted\[12\] to typeset listings. It is loaded by a package option or inside the preamble by:

\tcbuselibrary(minted)

This also loads the package \minted\[12\].

The \minted\ package uses the external tool \Pygments\[14\] to apply syntax highlighting. It has to be installed and set up, before the library can be used, see \[12\] and \[14\]. The \tcolorbox\ library \minted\ does not work, if the package \minted\[12\] does not work.

The /tcb/listing engine$^{\text{P.332}}$ is set to \minted\ by the library. To reactivate this setting, if overwritten by other libraries, use

\tcbset{listing engine=minted}

17.2 Common Macros of the Libraries

\begin{\tcblisting}{⟨options⟩}
\langle{environment content}\rangle
\end{\tcblisting}

Creates a colored box based on a \tcolorbox$^{\text{P.12}}$. Controlled by the given ⟨options⟩, the environment content is typeset normally and/or as a listing. Furthermore, the ⟨options⟩ control appearance and functions of the \tcolorbox. By default, the listing is interpreted as a \LaTeX\ listing.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black}
This is a \LaTeX\ example which displays the text as source code and in compiled form.
\end{tcblisting}

This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code and in compiled form.
This is source code in another language (XML)

```xml
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=".">
  <description>
    Apache Ant build file (http://ant.apache.org/)
  </description>
</project>
```

% This box is as wide as needed (listing only !!)
% \tcbuselibrary{skins}
\begin{tcblisting}{colback=green!5!white,colframe=green!50!black,listing only, hbox,enhanced,drop fuzzy shadow,before={\begin{center}},after={\end{center}}}
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcblisting}

\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
Saves the environment content to a file which is named by the key value of `listing file`. Later, this file can be loaded by \texttt{\textbackslash tcbinputlisting} or \texttt{\textbackslash tcbuselistingtext} or \texttt{\textbackslash tcbuselistinglisting}.

\begin{tcboutputlisting}
\begin{environment content}
\end{environment content}
\end{tcboutputlisting}

\texttt{\textbackslash tcbinputlisting}\{\textit{options}\}

Creates a colored boxed based on a \texttt{tcolorbox}. The text content is read from a file named by the key value of `listing file`. Apart from that, the function is equal to that of \texttt{\textbackslash tcblisting}\textsuperscript{→P.321}.

\begin{tcbinputlisting}
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcbinputlisting}

\texttt{\textbackslash tcbuselistingtext}

Loads text from a file named by the key value of `listing file`.

\begin{tcbuselistingtext}
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcbuselistingtext}

\texttt{\textbackslash tcbuselistinglisting}

Typesets text as listing from a file named by the key value of `listing file`.

\begin{tcbuselistinglisting}
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcbuselistinglisting}

\texttt{\textbackslash tcbusetemplisting}

Typesets text as listing from a temporary file which was written by \texttt{\textbackslash tcbwritetemp}\textsuperscript{→P.133}. 323
See Section 24.4 on page 470 and Section 24.5 on page 472 for more elaborate methods to create new environments and commands.

If a new sort of \texttt{tcblisting} environments should be created with one optional argument only, one is highly recommended to use \texttt{\DeclareTCBListing} \textsuperscript{p.470} or \texttt{\NewTCBListing} \textsuperscript{p.470} instead of \texttt{\newtcblisting} to avoid content scanning problems.

\texttt{\newtcblisting}(\textit{init options})\{\textit{name}\}\{\textit{number}\}\{\textit{default}\}\{\textit{options}\}

Creates a new environment \texttt{\textit{name}} based on \texttt{tcblisting} \textsuperscript{p.321}. Basically, \texttt{\newtcblisting} operates like \texttt{\newenvironment}. This means, the new environment \texttt{\textit{name}} optionally takes \texttt{\textit{number}} arguments, where \texttt{\textit{default}} is the default value for the optional first argument. The \texttt{\textit{options}} are given to the underlying \texttt{tcblisting}. Note that \texttt{/tcb/savedelimiter} \textsuperscript{p.26} is set to the given \texttt{\textit{name}} automatically. The \texttt{\textit{init options}} allow setting up automatic numbering, see Section 5 from page 114.

\begin{tcblisting}[mybox]{mybox}{%  
\begin{mybox}
This is my \LaTeX\ box.
\end{mybox}
%}

\begin{tcblisting}[mybox][1]{mybox}{%  
\begin{mybox}[\textit{Listing Box}]
This is my \LaTeX\ box.
\end{mybox}
%}

\begin{tcblisting}[mybox][2]{mybox}{%  
\begin{mybox}[\textit{listing only}]
\textit{Listing Box}
This is my \LaTeX\ box.
\end{mybox}
%}

\begin{tcblisting}[mybox]{\textit{listing side text}}{%  
\begin{mybox}
This is my \LaTeX\ box.
\end{mybox}
%}
Definition in the preamble:
\newtcblisting[auto counter]{mybox}[1]{% 
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  title=Listing \thetcbcounter: #1}

\begin{mycbox}{Listing Box}
This is my \LaTeX\ box.
\end{mycbox}

\renewtcblisting[\langle init options\rangle]{\langle name\rangle}{\langle number\rangle}{\langle default\rangle}{\langle options\rangle}

Operates like \newtcblisting $^\text{P.324}$, but based on \renewenvironment instead of \newenvironment. An existing environment is redefined.

### Listing 1: Listing Box

This is my \LaTeX\ box.

This is my \texttt{IpX} box.
\newtcbinputlisting[(init options)]\{⟨name⟩\}[⟨number⟩][⟨default⟩][⟨options⟩]

Creates a new macro \(⟨name⟩\) based on \texttt{tcbinputlisting}\textsuperscript{P.323}. Basically, \texttt{newtcbinputlisting} operates like \texttt{newcommand}. The new macro \(⟨name⟩\) optionally takes \(⟨number⟩\) arguments, where \(⟨default⟩\) is the default value for the optional first argument. The \(⟨options⟩\) are given to the underlying \texttt{tcbinputlisting}. The \(⟨init options⟩\) allow setting up automatic numbering, see Section 5 from page 114.

\newtcbinputlisting\[use counter from=mycbox\]{\mylisting}[2][{\%
listing file={#2},
title=Listing (\thetcbcounter) of \texttt{#2},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
listing only,breakable,#1}\]{\mylisting\[before upper=\textit{This is the included file content:}\]
\{\jobname.tcbtemp\}

Listing (2) of \texttt{tcolorbox.tcbtemp}

This is the included file content:
\newtcbinputlisting\[use counter from=mycbox\]{\mylisting}[2][{\%
listing engine=minted,minted language=latex,minted style=colorful,
listing file={#2},
title=Listing (\thetcbcounter) of \texttt{#2},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
listing only,breakable,#1}\]{\mylisting\[before upper=\textit{This is the included file content:}\]
\{\jobname.tcbtemp\}

Listing (3) of \texttt{tcolorbox.tcbtemp}

This is the included file content:
\newtcbinputlisting\[use counter from=mycbox\]{\mylisting}[2][{\%
listing engine=minted,minted language=latex,minted style=colorful,
listing file={#2},
title=Listing (\thetcbcounter) of \texttt{#2},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
listing only,breakable,#1}\]{\mylisting\[before upper=\textit{This is the included file content:}\]
\{\jobname.tcbtemp\}

\renewtcbinputlisting[(init options)]\{⟨name⟩\}[⟨number⟩][⟨default⟩][⟨options⟩]

Operates like \texttt{newtcbinputlisting}, but based on \texttt{renewcommand} instead of \texttt{newcommand}. An existing macro is redefined.
17.3 Option Keys of the listings Library

/tcb/listing options=(key list) (no default, initially style=tcblatex)

Sets the options from the package listings [6] which are used during typesetting of the listing. For \LaTeX\ listings, there is a predefined \texttt{ listings} style named \texttt{tcblatex} which can be used.

\begin{tcblisting}{colback=red!5!white,colframe=red!25,left=6mm, listing options={style=tcblatex,numbers=left,numberstyle=\tiny\color{red!75!black}}} This is a \LaTeX\ example which displays the text as source code and in compiled form. Additionally, we use line numbers here. \end{tcblisting}

\begin{tcblisting}{no listing options} All \textit{listings} options removed. \end{tcblisting}

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black, listing style=tcblatex} Here, we use the predefined style. \end{tcblisting}

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black, listing style=tcblatex} Here, we use the predefined style. \end{tcblisting}

/tcb/no listing options (no value, initially unset)

Abbreviation for \texttt{ listing options=\{}\texttt{\}}. This removes all options for the listings package. This includes the \texttt{tcblisting} standard style \texttt{tcblatex} and the encoding presets. Use this option, if you want to set the listings options outside of \texttt{tcblisting}, e.g. globally in the preamble.

/tcb/listing style=(style) (no default, initially tcblatex)

Abbreviation for \texttt{ listing options=\{}\texttt{\\{}\texttt{style=\ldots\\}}\texttt{\}}. This key sets a \langle style\rangle for the listings package, see [6]. For \LaTeX, there is a predefined style named \texttt{tcblatex}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black, listing style=tcblatex} Here, we use the predefined style. \end{tcblisting}

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black, listing style=tcblatex} Here, we use the predefined style. \end{tcblisting}
/tcb/listing inputencoding=(encoding)  (no default, initially \inputencodingname)

Sets the input encoding value for the predefined listing style \tcblatex and \tcbdocumentation from the library \documentations. The initial value is derived from the package \inputenc if used.

/tcb/listing remove caption=true|false  (default true, initially true)

If set to true, some part of the caption building code of the listings package is silenced to prevent some unwanted interaction with the hyperref package resulting in additional vertical space. If set to false, the listings package code is kept unchanged. Note that listings outside \tcblisting \-P.321 and \tcbinputlisting \-P.323 are always processed normally. Typically, a user is not expected to use this key at all.

/tcb/every listing line=(text)  (no default, initially unset/empty)

Inserts some \text to the begin of every line of a listing. Note that this a hack of the listings package code. This may become unusable or superfluous in the future.

\newtcblisting{commandshell}{colback=black,colupper=white,colframe=yellow!75!black,
listing only,listing options={style=tcblatex,language=sh},
every listing line={\textcolor{red}{\small	tfamily\bfseries root \$> }}}

\begin{commandshell}
ls -al
cd /usr/lib
\end{commandshell}

root \$> ls -al
root \$> cd /usr/lib

See further options in Section 17.6 on page 332.

! For an combined example of using \lstinline inside a tcolorbox, see \DeclareTotalTCBox \-P.468.
17.4 Option Keys of the \texttt{listingsutf8} Library

The \texttt{listingsutf8} library is not needed (and troublesome) when using XeLaTeX or LuaLaTeX. Therefore, loading this library is automatically replaced by loading \texttt{listings} only, if pdfLaTeX is \textit{not} used.

The \texttt{listingsutf8} library is an extension of the \texttt{listings} library, so all options from Section 17.3 on page 327 are applicable.

\texttt{/tcb/listing utf8=}\langle one-byte-encoding \rangle 

(style, no default, initially \texttt{latin1})

Abbreviation for using \texttt{/tcb/listing inputencoding} \texttt{\rightarrow P.328} together with UTF-8 support from the package \texttt{listingsutf8} [11]. This option is available only for the library variant \texttt{listingsutf8}. The \langle one-byte-encoding \rangle is one of the applicable encodings from [11], e.g. \texttt{latin1} which is the default.

Be aware that this means restriction to this specific \langle one-byte-encoding \rangle; e.g. \texttt{latin1} comprises umlauts and other accented characters, but not the Euro sign. If you want to use the \texttt{listings} package and «real» UTF-8 source code, then do not use \texttt{listingsutf8} but \texttt{listings} with \texttt{/tcb/listing inputencoding} \texttt{\rightarrow P.328=utf8} and with specific manual hacks for specific UTF-8-encoded characters.

See further options in Section 17.6 on page 332.
17.5 Option Keys of the \minted Library

\mintedlanguage{(programming language)}

Sets a \langle\textit{programming language}\rangle known to Pygments [14].

\begin{tcblisting}{listing engine=minted,minted style=trac,\linebreak[minted language=java,\linebreak[no default, initially \texttt{latex}]\linebreak[\texttt{colback=red!5!white},\texttt{colframe=red!75!black},listing only]}\begin{verbatim}
public class HelloWorld {
// A `Hello World` in Java
  public static void main(String[] args) {
    System.out.println("Hello World!");
  }
} \end{verbatim}
\end{tcblisting}

\tcb/minted options=(\textit{key list})

Sets the options from the package \texttt{minted} [12] which are used during typesetting of the listing. Also see /tcb/minted options app \linebreak[\textit{\texttt{P.461}}] and /tcb/minted options pre \texttt{\textit{P.461}}.

\begin{verbatim}
public class HelloWorld {
  // A `Hello World' in Java
  public static void main(String[] args) {
    System.out.println("Hello World!");
  }
} \end{verbatim}

U 2021-12-15
\texttt{/tcb/default\ minted\ options}=(\texttt{key\ list})\ (no\ default,\ initially\ \texttt{tabsize=2,fontsize=\small, breaklines,autogobble})

Sets the options from the package {minted} \cite{minted} which are used during typesetting of the listing, if \texttt{/tcb/minted\ options} \cite{minted} are \textit{not} used. The intended use is inside the preamble to change the default behavior. Note that setting \texttt{/tcb/default\ minted\ options} also resets \texttt{/tcb/minted\ options} \cite{minted}.

\begin{verbatim}
% inside the preamble
\tcbsset{%
default\ minted\ options={tabsize=4,fontsize=\normalsize},
}
\end{verbatim}

\texttt{/tcb/minted\ style}=(\texttt{style})\ (no\ default,\ initially\ unset)

Sets a \texttt{(style)} known to {Pygments} \cite{pygments}. This is independent from \texttt{/tcb/minted\ options} \cite{minted}. Note that styles are always applied globally; all following examples will be set in the given \texttt{(style)} until a new style is set. Also note that setting \texttt{\usemintedstyle{(style)}} only once per document is more economic, if all styles in a document are the same. For examples of different styles, see \texttt{/tcb/minted\ language} \cite{minted} and \texttt{/tcb/minted\ options} \cite{minted}.

See further options in Section 17.6 on the following page.
17.6 Common Option Keys of all Libraries

For the \textit{\textless options\textgreater} in \texttt{tcblisting} $\rightarrow$ P.321 respectively \texttt{tcbinputlisting} $\rightarrow$ P.323 the following \texttt{pgf} keys can be applied. The key tree path /tcb/ is not to be used inside these macros.

\texttt{/tcb/listing engine=\textless engine\textgreater} (no default)

Sets the \textit{\textless engine\textgreater} which typesets the listings. Feasible values are

- \texttt{listings}, if library \texttt{\{listings\}} or \texttt{\{listingsutf8\}} is loaded.
- \texttt{minted}, if library \texttt{\{minted\}} is loaded.

\texttt{/tcb/listing file=\textless file name\textgreater} (no default, initially \texttt{\jobname.listing})

Sets the \textit{\textless file name\textgreater} of the file which is used to save listings.

\texttt{/tcb/listing and text} (no value, initially set)

Typesets the environment content as listing in the upper part and as compiled text in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

This is an \TeX\ example.

\texttt{/tcb/text and listing} (no value)

Typesets the environment content as compiled text in the upper part and as listing in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text and listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

This is an \TeX\ example.

\texttt{/tcb/listing only} (no value)

Typesets the environment content as listing.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing only}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
/tcb/text only

Typesets the environment content as compiled text.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text only}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/comment=(text)

Records a comment with \langle \text{text} \rangle as content. The comment is displayed e.g. in conjunction with /tcb/listing and \text{comment} \rightarrow P.336 and /tcb/comment and \text{listing} \rightarrow P.336.

\begin{tcblisting}{comment={This comment is really only a comment},
colback=red!5!white,colframe=red!75!black}
This is a \textbf{tcolorbox}.
\end{tcblisting}

This is a \textbf{tcolorbox}.

This is a tcolorbox.

/tcb/comment only

Typesets the environment content with the comment text.

\begin{tcblisting}{comment only, comment={This is a comment.},
colback=red!5!white,colframe=red!75!black}
This is a \textbf{tcolorbox}.
\end{tcblisting}

This is a comment.

/tcb/image comment=\langle (options)\rangle\langle \text{filename}\rangle

(style, no default, initially unset)

Uses an image denoted by \langle \text{filename} \rangle as \text{comment} for the listing. The image is included by the standard \texttt{\includegraphics} macro with given \langle \text{options} \rangle.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment, image comment={width=2.5cm}{example-image-a.pdf},center lower}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

A
/tcb/tcbimage comment=⟨filename⟩  

Uses an image denoted by ⟨filename⟩ as comment for the listing. The image is included by the \texttt{tcbincludegraphics} → P.265 macro. The inclusion can be customized by /tcb/comment style → P.336.

The library \texttt{skins} is needed to apply this option.

% \texttt{tcbuselibrary{skins}}
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment, righthand width=3cm,lower separated=false, tcbimage comment=\{example-image-a.pdf\}, comment style=\{size=fbox,colframe=blue,colback=blue!50,sharp corners, drop fuzzy shadow\}}
This is a \LaTeX\ example.
\end{tcblisting}
This is a \LaTeX\ example.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and comment,
% \tcbuselibrary{skins,raster}
    righthand width=3cm,lower separated=false,middle=1mm,
    pdf comment={tcolorbox-example.pdf},
    comment style={raster columns=3,graphics pages={1,2,3},
                   colframe=blue,drop fuzzy shadow}}
This is a \LaTeX\ example.
\end{tcblisting}
Sets the PDF file name extension for \texttt{/tcb/pdf comment} to \langle\textit{extension}\rangle. Note that \langle\textit{extension}\rangle always overwrites any actual extension given inside \texttt{/tcb/pdf comment}.

Sets the \langle\textit{options}\rangle for \texttt{/tcb/tcbimage comment} and \texttt{/tcb/pdf comment}. These are \texttt{tcolorbox} options to customize the colored box drawn around the image(s), also image options encapsulated by \texttt{/tcb/graphics options}, and \texttt{tcbraster} options for \texttt{/tcb/pdf comment}.

\texttt{/tcb/listing and comment} (no value)

Typesets the environment content as listing in the upper part and a given comment in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment and listing,comment={This is my comment. \par It can even use the environment content «This is a \LaTeX\ example.»}}
This is a \LaTeX\ example.
\end{tcblisting}

\texttt{/tcb/comment and listing} (no value)

Typesets a given comment in the upper part and the environment content as listing in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment and listing,comment={This is my comment.}}
This is a \LaTeX\ example.
\end{tcblisting}
/tcb/listing side text

Typesets the environment content side by side as listing in the left (upper) part and as compiled text in the right (lower) part. This is a shortcut for setting /tcb/listing and text → P.332 and /tcb/sidebyside → P.123.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example. This is a \LaTeX\ example.

Note that sidebyside=false has to be added, if the setting of /tcb/listing side text is to be annihilated.

/tcb/text side listing

Typesets the environment content side by side as compiled text in the left (upper) part and as listing in the right (lower) part. This is a shortcut for setting /tcb/text and listing → P.332 and /tcb/sidebyside → P.123.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text side listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example. This is a \LaTeX\ example.

/tcb/listing outside text

Typesets the environment content side by side as listing in a tcolorbox and as compiled text outside the box in the right part of the page. Nevertheless, the outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 123.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing outside text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example. This is a \LaTeX\ example.
/tcb/text outside listing

Typesets the environment content side by side as listing in a \texttt{tcolorbox} and as compiled text outside the box in the left part of the page. Nevertheless, the outside text is treated as \textit{lower} part of the \texttt{tcolorbox} and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 123.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,font out}{text outside listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\newpage

/tcb/listing side comment

Typesets the environment content side by side as listing in the left (upper) part and a given comment in the right (lower) part. This is a shortcut for setting \texttt{/tcb/listing} and \texttt{comment} → P.336 and \texttt{/tcb/sidebyside} → P.123.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment, righthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\newpage

/tcb/comment side listing

Typesets the environment content side by side with a given comment in the left (upper) part and as listing in the right (lower) part. This is a shortcut for setting \texttt{/tcb/comment} and \texttt{listing} → P.336 and \texttt{/tcb/sidebyside} → P.123.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment side listing, lefthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
/tcb/listing outside comment

Typesets the environment content side by side as listing in a tcolorbox and a given comment outside the box in the right part of the page. Nevertheless, the outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 123.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing outside comment,
  righthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
  This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/comment outside listing

Typesets the environment content side by side as listing in a tcolorbox and a given comment outside the box in the left part of the page. Nevertheless, the outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 123.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment outside listing,
  lefthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
  This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/listing above text

Typesets the environment content as listing in a tcolorbox and as compiled text outside and below the box. The outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The distance between box and text is controlled by /tcb/middle \textsuperscript{P.43}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above text}
  This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/listing above* text

Widely equal to /tcb/listing above text, but the outside text is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and text is controlled by /tcb/after \textsuperscript{P.81}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above* text}
  This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
/tcb/text above listing

Typesets the environment content as listing in a \texttt{tcolorbox} and as compiled text outside and above the box. The outside text is treated as \textit{lower} part of the \texttt{tcolorbox} and can be formatted with all lower part options. The distance between box and text is controlled by /tcb/middle $\rightarrow$ P.43.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text above listing}
This is a \LaTeX\ example.
\end{tcblisting}

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above comment, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above* listing}
This is a \LaTeX\ example.
\end{tcblisting}

/tcb/text above* listing

Widely equal to /tcb/text above listing, but the outside text is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and text is controlled by /tcb/before $\rightarrow$ P.81.

/tcb/listing above comment

Typesets the environment content as listing in a \texttt{tcolorbox} and a given comment outside and below the box. The outside text is treated as \textit{lower} part of the \texttt{tcolorbox} and can be formatted with all lower part options. The distance between box and comment is controlled by /tcb/middle $\rightarrow$ P.43.

/tcb/listing above* comment

Widely equal to /tcb/listing above comment, but the outside comment is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and comment is controlled by /tcb/after $\rightarrow$ P.81.
/tcb/comment above listing (no value)

Typesets the environment content as listing in a tcolorbox and a given comment outside and above the box. The outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The distance between box and comment is controlled by /tcb/middle → P.43.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment above listing, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/comment above* listing (no value)

Widely equal to /tcb/comment above listing, but the outside comment is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and comment is controlled by /tcb/before → P.81.
17.7 Option Keys for Processing and Full Document Examples

A complete \LaTeX{} document including \texttt{documentclass}, \texttt{\begin{document}} and \texttt{\end{document}} cannot be processed directly by \texttt{tcolorbox}. It always has to be compiled separately. There are two methods supported by the package to process and display such a full document example:

- Prepare and compile the example document independent from your main document. The source file and the resulting PDF file can be included into the main document afterwards. This is the most economic way since the example document can be left untouched after the example is complete.

- The other possibility is to compile the example on the fly while the main document is compiled. This way has some charm, because the example can be edited inside the main document. But be aware that the compilation of the example is issued on every run of the main document. Also, there are fewer degrees of freedom how the example is compiled.

For both methods, the resulting example PDF file can be included as a \texttt{/tcb/pdf comment}\(^\text{P.335}\).

The following example shows how to apply the first method. There already is a file \texttt{tcolorbox-example.tex} and a PDF file \texttt{tcolorbox-example.pdf}. Both of them are input partly by the following:

```latex
\documentclass{article}
\usepackage{tikz,lipsum,lmodern}
\usepackage[most]{tcolorbox}

\begin{document}
\section{Colored boxes}
\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black]
My box.
\end{tcolorbox}

\begin{tcolorbox}[colback=blue!5!white,colframe=blue!75!black,title=My title]
My box with my title.
\end{tcolorbox}

\begin{tcolorbox}[colback=green!5!white,colframe=green!75!black]
\end{tcolorbox}
```

% \tcbuselibrary{breakable,skins,raster}
% \tcbinputlisting{
% enhanced jigsaw,breakable,pad at break*=2mm,height fixed for=first and middle,
% lower separated=false,
% leftlower=0pt,rightlower=0pt,middle=0pt,
% colframe=red!50!black,colback=yellow!10!white,
% listing and comment,
% listing file={tcolorbox-example},
% listing options=
% {style=tcblatex,texcsstyle=\color{red!70!black},firstline=20,lastline=85},
% after upper={\par\bigskip\texttt{\ldots}\par},
% pdf comment,
% comment style={drop lifted shadow,graphics pages={1,...,4}},
% }
```
Upper part of my box.
\tcblower
Lower part of my box.
\end{tcolorbox}

\begin{tcolorbox}[colback=yellow!5!white,colframe=yellow!50!black,\]
colbacktitle=yellow!75!black,title=My title]
I can do this also with a title.
\tcblower
Lower part of my box.
\end{tcolorbox}

\begin{tcolorbox}[colback=yellow!10!white,colframe=red!75!black,\]
lowerbox=invisible,savelowerto=\jobname_ex.tex]
Now, we play hide and seek. Where is the lower part?
\tcblower
I'm invisible until you find me.
\end{tcolorbox}

\begin{tcolorbox}[colback=yellow!10!white,colframe=red!75!black,title=Here I am]\]
\input{\jobname_ex.tex}
\end{tcolorbox}

\begin{tcolorbox}[enhanced,sharp corners=uphill,\]
colback=blue!50!white,colframe=blue!25!black,coltext=yellow,\]
fontupper=\Large\bfseries,arc=6mm,boxrule=2mm,boxsep=5mm,\]
borderline={0.3mm}{0.3mm}{white}]
Funny settings.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,frame style image=blueshade.png,\]
opacityback=0.75,opacitybacktitle=0.25,\]
colback=blue!15!white,colframe=blue!75!black,\]
title=My title]
This box is filled with an external image.\par
Title and interior are made partly transparent to show the image.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,attach boxed title to top\]
center={yshift=-3mm,yshifttext=-1mm},\]
colback=blue!15!white,colframe=blue!75!black,colbacktitle=red!80!black,\]
title=My title,fonttitle=\bfseries,\]
boxed title style={size=small,colframe=red!50!black} ]
...

343
1 Colored boxes

My box.

This box is filled with an external image.

My box.

This box is filled with an external image.

My title

My box with my title.

Upper part of my box.

Lower part of my box.

My title

I can do this also with a title.

This box uses a boxed title. The box of the title can be formatted independently from the main box.

2 Watermarks

Here, you see my nice box with a picture as a watermark. This picture is...

3 Other

Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat

3.2 Theorem (Summation of Numbers):

We have given Theorem 3.1 on page 2.

4 Watermarks

How can I make a box?

This box is automatically created by my package. Instead of a name, some text could be added instead of a graphical code. For the documentation for my package, see the documentation for my package.

5 Boxes in boxes

How can I make a breakable box?

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, nonummy in, fermentum eu, sodales cursus, magna.

Here I am

Theorem 3.1: Summation of Numbers

There are several ways to write this theorem.

\[ \sum_{i=1}^{n} i = \frac{n(n+1)}{2}. \]

6 Breakable Boxes

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, nonummy in, fermentum eu, sodales cursus, magna.

Here I am

Theorem 3.1: Summation of Numbers

There are several ways to write this theorem.

\[ \sum_{i=1}^{n} i = \frac{n(n+1)}{2}. \]
/tcb/no process
(no default)
Removes all processing commands if set before.

/tcb/process code\langle code\rangle
(no default, initially empty)
Adds \langle code\rangle which is executed during \texttt{\textbackslash tcbinputlisting\textasciitilde P.323} and \texttt{\textbackslash tcblisting\textasciitilde P.321}. At the time of executing the given \langle code\rangle, the listing is already written to \texttt{/tcb/listing file\textasciitilde P.332}, but the colored box is not constructed yet. Its intended use is to process the listing somehow before displaying. The processing result can be used inside a \texttt{\textbackslash tcb/comment\textasciitilde P.333}. Several /tcb/process code options can be given which are processed in the given order. Typically, \langle code\rangle is added by using the following styles /tcb/run system command, /tcb/run pdflatex, etc.

To use the further options, the compiler has to be called with the \texttt{-shell-escape} permission to authorize potentially dangerous system calls. Be warned that this is a security risk. Anyway, it’s more economic to compile examples independent from the main document and to include them as shown in the previous pages.

/tcb/run system command\langle system command\rangle
(style, no default, initially unset)
Runs a \langle system command\rangle, if the document is compiled with the \texttt{-shell-escape} permission. The current listing file can be accessed as \texttt{\jobname\textasciitilde area\textasciitilde base\textasciitilde ext}. This \langle system command\rangle is added to \texttt{/tcb/process code}.

/tcb/compilable listing
(style, no default)
Sets \texttt{/tcb/listing file\textasciitilde P.332} to \texttt{\jobname\textasciitilde listing\textasciitilde \langle counter\rangle}.

The default \texttt{/tcb/listing file\textasciitilde P.332} setting cannot be used to compile a listing, since the base name equals the \texttt{\jobname} and the included PDF files should be unique. Therefore, to use \texttt{/tcb/run pdflatex} etc., the \texttt{/tcb/listing file\textasciitilde P.332} has to be set to a unique value. One may use \texttt{/tcb/compilable listing} for this purpose.

/tcb/run pdflatex\langle arguments\rangle
(style, no default, initially unset)
Issues a \texttt{pdflatex} compilation of the listing with the given \langle arguments\rangle.

• The main document has to be compiled with the \texttt{-shell-escape} permission.
• The \texttt{/tcb/listing file\textasciitilde P.332} has to be unique for the listing.
• If the listing has to be compiled twice, add \texttt{run pdflatex} two times to the option list.

\begin{tcblisting}{enhanced jigsaw,lower separated=false, leftlower=0pt,rightlower=0pt, colframe=red!50!black,colback=yellow!10!white, listing options={style=tcblatex,texcsstyle=\color{red!70!black}}, listing and comment, pdf comment,freeze pdf, compilable listing, run pdflatex}
\documentclass{beamer}
\usetheme{Warsaw}
\begin{document}
\begin{frame}{Beamer example}
\begin{block}{Hello World}
\begin{itemize} [<+->]
\item One
\item Two
\end{itemize}
\end{block}
\end{frame}
\end{document}
\end{tcblisting}
\begin{block}{Integral}
\begin{equation}
\int \limits_1^x \frac{1}{t} \, dt = \ln(x).
\end{equation}
\end{block}

\begin{frame}{Beamer example}
Hello World
\begin{itemize}
\item One
\item Two
\end{itemize}
\end{frame}

\begin{frame}{Beamer example}
\begin{block}{Integral}
\begin{equation}
\int \limits_1^x \frac{1}{t} \, dt = \ln(x).
\end{equation}
\end{block}
\end{frame}

Beamer example

Beamer example
\begin{tcblisting}{enhanced jigsaw,\
title={PSTricks with pdflatex},fonttitle=\bfseries,\
colframe=red!50!black,colback=yellow!10!white,\
listing options={style=tcblatex,texcsstyle=\*\color{red!70!black}},\
lower separated=false,middle=0pt,\
listing side comment,righthand width=4cm,\
compilable listing,\
r \texttt{run latex,run dvips,run ps2pdf,}\
\texttt{pdf comment,freeze pdf,}\
comment style=\{raster columns=1,}\
\texttt{graphics options={viewport=0.5in 7.7in 3.5in 10.5in,clip}},}\
\end{tcblisting}

\begin{document}
\psset{unit=3}\%
\multido{\nHue=0.01+0.01}{100}{\%
\definecolor{MyColor}{hsb}{\nHue,1,1}\%
\pscircle[linewidth=0.01,linecolor=MyColor]{\nHue}}\
\end{document}

\documentclass{article}\n\usepackage{pstricks,multido}\n\begin{document}
\psset{unit=3}\%
\multido{\nHue=0.01+0.01}{100}{\%
\definecolor{MyColor}{hsb}{\nHue,1,1}\%
\pscircle[linewidth=0.01,linecolor=MyColor]{\nHue}}\
\end{document}

PSTricks with pdflatex

\documentclass{article}\n\usepackage{pstricks,multido}\n\begin{document}\n\psset{unit=3}\%
\multido{\nHue=0.01+0.01}{100}{\%
\definecolor{MyColor}{hsb}{\nHue,1,1}\%
\pscircle[linewidth=0.01,linecolor=MyColor]{\nHue}}\
\end{document}
For most applications, you will like to add `/tcb/freeze pdf` as option, since the included pdf file is only refreshed, if the source for this file has changed.

N 2016-07-14 `/tcb/freeze file=(file)` (no default, initially unset)

Observes some ⟨file⟩, usually the final file produced by `/tcb/process code` → P.345, `/tcb/run system command` → P.345, `/tcb/run pdflatex` → P.345, etc. If the MD5 checksum of the current `/tcb/listing file` → P.332 is unchanged and ⟨file⟩ exists, the processing is skipped and the ⟨file⟩ is kept (frozen). Typically, the style `/tcb/freeze pdf` can be used for convenience.

N 2016-07-14 `/tcb/freeze none` (no default, initially set)

Freeze no file and always execute the given process commands.

N 2016-07-14 `/tcb/freeze extension=(text)` (style, no default)

Calls `/tcb/freeze file` with the current `/tcb/listing file` → P.332 stripped with its extension plus ⟨text⟩ as new extension.

```
...  
listing file=myfile.tex,  
freeze extension=-modified.pdf,  
% -> myfile-modified.pdf is observed  
...
```

N 2016-07-14 `/tcb/freeze pdf` (no value)

Calls `/tcb/freeze file` with the current `/tcb/listing file` → P.332 stripped with its extension plus .pdf as new extension.

N 2016-07-14 `/tcb/freeze png` (no value)

Calls `/tcb/freeze file` with the current `/tcb/listing file` → P.332 stripped with its extension plus .png as new extension. See the examples for `/tcb/run pdflatex` → P.345 and `/tcb/run ps2pdf` → P.347.

N 2016-07-14 `/tcb/freeze jpg` (no value)

Calls `/tcb/freeze file` with the current `/tcb/listing file` → P.332 stripped with its extension plus .jpg as new extension.
17.8  Creation of \LaTeX\ Tutorials

The following source code gives a guideline for the creation of \LaTeX\ tutorials. In the next section, a framework for \LaTeX\ exercises is described. All examples shall be numbered optionally.

Firstly, some additional \texttt{tcb} keys are defined for the appearance. For the examples, three environments \texttt{texexp}, \texttt{texexptitled}, and \texttt{texexptitledspec} are defined with automatic numbering.

- \texttt{texexp} is used for untitled examples,
- \texttt{texexptitled} is used for titled examples,
- \texttt{texexptitledspec} is used for titled examples with special treatment.

\begin{tcblisting}{texexp}
This is a \LaTeX\ example which displays the text as source code and in compiled form.
\end{tcblisting}

\begin{texexptitled}{First example with a title line}{firstExample}
Here, we use Example \ref{firstExample} with a title line.
\end{texexptitled}

\begin{example}
Example 17.1: First example with a title line
Here, we use Example \ref{firstExample} with a title line.
\end{example}
This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code only.

This is a \LaTeX\ example which displays the text in compiled form only.

Here, we see Example 17.2.
The keys can be used in combination. Here, an example with a heading line and source code only is given.

Here, we see Example \ref{heading2}.

**Example 17.3: Another Example with a Heading**

The keys can be used in combination. Here, an example with a heading line and source code only is given.

Here, we see Example 17.3.

**Example 17.4: A floating Example with a Heading**

This is another \LaTeX\ example with numbered heading line. But now, the box is a floating object.

The floating box of the last example is seen as Example \ref{heading3} on page \pageref{heading3}.

The floating box of the last example is seen as Example 17.4 on page 351.

**Example 17.5: Special application**

Some \LaTeX\ source code.

For special cases, the environment \texttt{tcolorboxspec} with style \texttt{example} can be used directly. As one can see, the upper and the lower part of the box can be used uncoupled also.

The following series of examples demonstrate the application of \texttt{tcolorbox} options for diversification.
Example 17.6: How to use options (1):
The basic example

\begin{tikzpicture}
\path [fill=yellow!50!white] (0,0) circle (11mm);
\path [fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path [shading=ball, ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}

Example 17.7: How to use options (2):
The text output is centered and the segmentation line has vanished.

\begin{tikzpicture}
\path [fill=yellow!50!white] (0,0) circle (11mm);
\path [fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path [shading=ball, ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
Example 17.8: How to use options (3): Here, the `tikzpicture` is totally hidden. The `bicolor` skin highlights the output.

```latex
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
```

Example 17.9: How to use options (4): The `bicolor` skin also works with side by side mode.

```latex
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
```
Example 17.10: How to use options (5):
Putting our picture outside is just a matter of one word.
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
 (\w:1cm) circle (7mm);}
\end{tikzpicture}

Example 17.11: How to use options (6):
The picture may also be put above the listing box.
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
 (\w:1cm) circle (7mm);}
\end{tikzpicture}
Example 17.12: How to use options (7): Our style is easily transformed into a beamerish one.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
 (\w:1cm) circle (7mm);}
\end{tikzpicture}
17.9 Creation of \LaTeX Exercises

In the following, a guideline is given for the creation of \LaTeX exercises with solutions. These solutions are saved to disk for application at a place of choice. Therefore, all used exercises are logged to a file \jobname.records for automatic processing. The solution contents themselves are saved to a subdirectory named solutions. Also see Section 8 on page 135.

- Before the first exercise is given, \texttt{tcbstartrecording} \footnote{P.135} has to be called to start recording.

- The solution is given as content of a \texttt{tcboutputlisting} \footnote{P.323} environment. Note, that you can use this content also inside the exercise with \texttt{tcbuselistingtext} \footnote{P.323} in compiled form.

- After the last exercise is given (and before using the solutions), \texttt{tcbstoprecording} \footnote{P.135} has to be called to stop recording.

- The solutions are loaded by \texttt{tcbinputrecords} \footnote{P.135}.

Inside the exercise text, there may be text parts which are needed as \LaTeX source code and as compiled text as well. These parts can be saved by \texttt{tcbwritetemp} \footnote{P.133} and used in compiled form by \texttt{tcbusetemp} \footnote{P.133} or as source code by \texttt{tcbusetemplisting} \footnote{P.323}.

At first, we generate some a common style for the exercises and the solutions. Further, since exercises and solutions should be numbered, we force to use a label \langle marker \rangle. Automatically, the label \texttt{exe:⟨marker⟩} is used to mark the exercise and the label \texttt{sol:⟨marker⟩} is used to mark the solution.

\begin{verbatim}
\tcbset{texercisestyle/.style={arc=0.5mm, colframe=blue!25!yellow!90!white, colback=blue!25!yellow!5!white, coltitle=blue!25!yellow!40!black, fonttitle=\small\sffamily\bfseries, fontupper=\small, fontlower=\small, listing options={style=tcblatex,texcsstyle=\color{red!40!black}},}}
\end{verbatim}

With these preparations, the kernel environment \texttt{texercise} for our exercises is created quickly:

\begin{verbatim}
\newtcolorbox[auto counter,number within=section,list inside=exam]{texercise}[2][]{\% texercisestyle, listing file={solutions/texercise/thetcbcounter.tex}, label={exe:#2}, record={\string\processsol{solutions/texercise/thetcbcounter.tex}{#2}}, title={Exercise \thetcbcounter \hfill Solution on page \pageref{sol:#2}}, list text={Exercise with solution on page \pageref{sol:#2}},#1}
\end{verbatim}

\textit{Definition in the preamble:}

\begin{verbatim}
\newtcolorbox[auto counter,number within=section,list inside=exam]{texercise}[2][]{\% texercisestyle, listing file={solutions/texercise/thetcbcounter.tex}, label={exe:#2}, record={\string\processsol{solutions/texercise/thetcbcounter.tex}{#2}}, title={Exercise \thetcbcounter \hfill Solution on page \pageref{sol:#2}}, list text={Exercise with solution on page \pageref{sol:#2}},#1}
\end{verbatim}
The following examples demonstrate the application.

\begin{tcboutputlisting}
\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|p{3cm}|}
\hline
<table>
<thead>
<tr>
<th>Das alte Italien</th>
<th>Mittelalter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Republik</td>
<td>Kaiserreich</td>
</tr>
<tr>
<td>In den Zeiten der römischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren. &amp; Das römische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert. &amp; In der Völkerwanderungszeit übernahmen die Goten und später die Franken die Vorherrschaft. &amp; Im späteren Mittelalter regierten Fürsten einen Fleckenteppich von Einzelstaaten.</td>
<td></td>
</tr>
</tbody>
</table>
\hline
\end{tabular}
\end{tcboutputlisting}
Create a new macro \verb+\headingline+ which produces the following output:
\headingline{Very important heading}

\begin{texercise}{macro_oneparam}
\begin{tcboutputlisting}
\newcommand{\headingline}{\begin{center}{Large bfseries #1}\end{center}}
\end{tcboutputlisting}
\tcbuselistingtext
\end{texercise}

\begin{texexercise}{macro_twoparam}
\begin{tcboutputlisting}
\newcommand{\minitable}{\begin{center}{\begin{tabular}{p{10cm}}
\hline \multicolumn{1}{c}{\bfseries#1}\
\hline #2\
\hline \end{tabular}}\end{center}}
\end{tcboutputlisting}
\tcbuselistingtext
\end{texercise}

Exercise 17.2

Create a new macro \headingline which produces the following output:
\headingline{Very important heading}

Very important heading

Exercise 17.3

Create a new macro \minitable which produces the following output:
\minitable{My heading}{In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.}

\begin{texercise}{macro_twoparam}
\begin{tcboutputlisting}
\newcommand{\minitable}{\begin{center}{\begin{tabular}{p{10cm}}
\hline \multicolumn{1}{c}{\bfseries#1}\
\hline #2\
\hline \end{tabular}}\end{center}}
\end{tcboutputlisting}
\tcbuselistingtext
\end{texercise}

\begin{texexercise}{macro_twoparam}
\begin{tcboutputlisting}
\newcommand{\minitable}{\begin{center}{\begin{tabular}{p{10cm}}
\hline \multicolumn{1}{c}{\bfseries#1}\
\hline #2\
\hline \end{tabular}}\end{center}}
\end{tcboutputlisting}
\tcbuselistingtext
\end{texercise}

My heading
In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.
Create a new macro \verb+\synop+ which typesets a synoptic text according to the following example. Base your macro on a tabular which takes the total line width.

\begin{tcbwritetemp}
\synop{Neil Armstrong}
\{That’s one small step for a man, one giant leap for mankind.\}
\{Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit.\}
\end{tcbwritetemp}

\begin{tabular}{|p{\linewidth/2}|p{\linewidth/2}|}
\hline
\multicolumn{2}{|c|}{\bfseries Neil Armstrong}\\
\hline
\multicolumn{1}{c|}{\itshape English}&\multicolumn{1}{c}{\itshape German}\\
\hline
That’s one small step for a man, one giant leap for mankind. & Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit. \\
\hline
\end{tabular}

Exercise 17.4

Create a new macro \verb+\synop+ which typesets a synoptic text according to the following example. Base your macro on a tabular which takes the total line width.

\synop{Neil Armstrong}
\{That’s one small step for a man, one giant leap for mankind.\}
\{Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit.\}

Now, we give a list of all exercises with:

\begin{tcblistof}\subsection{List of Exercises}
\item{Exercise with solution on page 360}{357}
\item{Exercise with solution on page 360}{358}
\item{Exercise with solution on page 360}{358}
\item{Exercise with solution on page 361}{359}
\end{tcblistof}
17.11 Solutions for the given \LaTeX\ Experiments

For all solutions, a macro \texttt{\processsol} was written to the file \texttt{\jobname.records}. Now, we need a definition for this macro to use the solutions.

\begin{verbatim}
% \usepackage{hyperref} \% for phantomlabel
\newtcbinputlisting{\processsol}{\%
texercisestyle, listing only, listing file={#1}, phantomlabel={sol:#2}, title={Solution for Exercise \ref{exe:#2} on page \pageref{exe:#2}},}
\end{verbatim}

The loading of all solutions is done by:

\texttt{\tcbinputrecords}

With this, we get:

### Solution for Exercise 17.1 on page 357

\begin{verbatim}
\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|p{3cm}|}
\hline
\multicolumn{4}{|c|}{\bfseries\itshape Das alte Italien} \\
\hline
\multicolumn{2}{|c|}{\bfseries Antike} & \multicolumn{2}{c|}{\bfseries Mittelalter} \\
\hline
\multicolumn{1}{|c|}{\itshape Republik} & \multicolumn{1}{c|}{\itshape Kaiserreich} & \multicolumn{1}{c|}{\itshape Franken} & \multicolumn{1}{c|}{\itshape Teilstaaten} \\
\hline
In den Zeiten der römischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren. & Das römische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert. & In der Völkerwanderungszeit übernahmen die Goten und später die Franken die Vorherrschaft. & Im späteren Mittelalter regierten Fürsten einen Fleckenteppich von Einzelstaaten. \\
\end{tabular}
\end{verbatim}

### Solution for Exercise 17.2 on page 358

\begin{verbatim}
\newcommand{\headingline}[1]{\%}
\begin{center}\Large\bfseries #1\end{center}
\end{verbatim}

### Solution for Exercise 17.3 on page 358

\begin{verbatim}
\newcommand{\minitable}[2]{\%}
\begin{center}\begin{tabular}{p{10cm}}\hline
\multicolumn{1}{c}{\bfseries#1} \\
#2\hline
\end{tabular}\end{center}
\end{verbatim}
\newcommand{\synop}[3]{% 
\begin{tabular}{@{}p{(#linewidth-\tabcolsep\times2-\arrayrulewidth)/2}@{|p{(#linewidth-\tabcolsep\times2-\arrayrulewidth)/2}}@{}}
\hline
\multicolumn{2}{c}{\bfseries #1} \\
\multicolumn{1}{c|}{\itshape English} & \multicolumn{1}{c}{\itshape German} \\
\hline
#2 & #3
\end{tabular}}%
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{theorems}

This also loads the package amsmath.

## 18.1 Macros of the Library

\newtcbtheorem[(init options)]{⟨name⟩}{⟨display name⟩}{⟨options⟩}{⟨prefix⟩}

Creates new environments ⟨name⟩ and ⟨name⟩* based on tcolorbox to frame a (mathematical) theorem. The ⟨display name⟩ is used in the title line with a number, e.g. «Theorem 5.1». The ⟨options⟩ are given to the underlying tcolorbox to control the appearance. The ⟨init options⟩ allow setting up automatic numbering, see Section 5 on page 114. The new environment ⟨name⟩ takes one optional and two mandatory parameters. The optional parameter supplements the options and should be used only in rare cases. The first mandatory parameter is the title text for the theorem and is also set as /tcb/nameref → P.105 identifier. The second mandatory parameter is a ⟨marker⟩. The theorem is automatically labeled with ⟨prefix⟩⟨separator⟩⟨marker⟩ where ⟨separator⟩ is predefined as “:”, see /tcb/label separator → P.369.

The new environment ⟨name⟩* takes one optional and one mandatory parameter and represents an unnumbered variant of the environment ⟨name⟩. This variant is not labeled and not listed in lists of theorems.

### Definition in the preamble:

\newtcbtheorem[number within=section]{mytheo}{My Theorem}
\%
{colback=green!5,colframe=green!35!black,fonttitle=\bfseries}{th}
\% usage of \texttt{`\nameref'} needs `\nameref' or `\hyperref' to be loaded
\begin{mytheo}{This is my title}{theoexample}
This is the text of the theorem. The counter is automatically assigned and, in this example, prefixed with the section number. This theorem is numbered with \ref{th:theoexample}, it is given on page \pageref{th:theoexample}, and it is titled \llap{\texttt{«\nameref{th:theoexample}\texttt{»}}}.
\end{mytheo}

My Theorem 18.1: This is my title
This is the text of the theorem. The counter is automatically assigned and, in this example, prefixed with the section number. This theorem is numbered with 18.1, it is given on page 362, and it is titled «This is my title».

\begin{mytheo}[label=myownlabel]{This is my title}{}
The label parameter can be left empty without \LaTeX error. Or you may use an own label to reference Theorem \ref{myownlabel}.
\end{mytheo}

My Theorem 18.2: This is my title
The label parameter can be left empty without \LaTeX error. Or you may use an own label to reference Theorem 18.2.
\begin{mytheo}{ } 
The title can also be left empty without problem. Note that the \enquote{:} vanished magically. 
\end{mytheo}

My Theorem 18.3 
The title can also be left empty without problem. Note that the “;” vanished magically.

\begin{mytheo*}{Unnumbered Theorem} 
This theorem is not numbered. 
\end{mytheo*}

My Theorem: Unnumbered Theorem 
This theorem is not numbered.

\begin{mytheo*}{ } 
This theorem has no number and no title. 
\end{mytheo*}

My Theorem 
This theorem has no number and no title.

! 
To switch off the nameref feature permanently, add \texttt{nameref/.style={}} inside the \texttt{\langle options\rangle} list.

\texttt{\renewtcbtheorem[(init options)]{\langle name\rangle}{\langle display name\rangle}{\langle options\rangle}{\langle prefix\rangle}}

Operates like \texttt{\newtcbtheorem \rightarrow P.362}, but based on \texttt{\renewenvironment} instead of \texttt{\newenvironment}. An existing environment is redefined.
\textbf{tcolorbox} \textit{P.12} \text{ which is fitted to the width of the given ⟨mathematical box content⟩. This box is intended to be applied as part of a larger formula and may be used as replacement for the \boxed macro of amsmath.}

\begin{equation}
\begin{align}
\text{\texttt{tcbset}} & \{\text{fonttitle=\scriptsize}\} \\
\texttt{tcbmath} & \{\text{colback=LightBlue!25!white,colframe=blue}\{ a^2 = 16 \} \\
\texttt{quad} & \Rightarrow \texttt{quad} \\
\texttt{tcbmath} & \{\text{colback=Salmon!25!white,colframe=red,title=Implication}\} \% \\
\{ a = 4 \text{ -} \vee - a=-4. \} \\
\end{align}
\end{equation}

\begin{equation}
\begin{align}
a^2 = 16 & \Rightarrow \text{Implication} \\
a = 4 & \text{ } \vee \text{ } a=-4. \\
\end{align}
\end{equation}

\textbf{tcbhighmath} \textit{P.374} \text{ which uses the style /tcb/highlight math. It is intended to provide context sensitive highlighting of formula parts. The color settings via /tcb/highlight math style may be different inside theorems or other colored areas and outside.}

\begin{align}
\text{\texttt{tcbset}} & \{\text{myformula/.style=\{}\text{colback=yellow!10!white,colframe=red!50!black, every box/.style=\{}\text{highlight math style=\{}\text{colback=LightBlue!50!white,colframe=Navy}\}\}\}} \\
\begin{align}
\texttt{\begin{align}} & \{\text{\sum\limits_{n=1}^{\infty} \frac{1}{n}} \Rightarrow \text{\texttt{\infty.}} \\
\texttt{\int x^2 } & \Rightarrow \text{\texttt{\frac{13 x^3 + c.}}}
\end{align}\}
\end{align}

\begin{align}
\text{\texttt{\begin{align}} & \{\text{\sum\limits_{n=1}^{\infty} \frac{1}{n}} \Rightarrow \text{\texttt{\infty.}} \\
\texttt{\int x^2 } & \Rightarrow \text{\texttt{\frac{13 x^3 + c.}}}
\end{align}\}
\end{align}

364
\texttt{\textbackslash tcbhighmath} \texttt{\rightarrow P.364} can be used in symbiosis with the \texttt{empheq} package which allows to specify own boxing commands to mark multiline formulas.

\begin{empheq}\[box=\tcbhighmath\]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}

\begin{tcbset}{highlight math style={enhanced, colframe=red!60!black, colback=yellow!50!white, arc=4pt, boxrule=1pt, drop fuzzy shadow}}
\begin{empheq}\[box=\tcbhighmath\]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}
\end{tcbset}

Besides \texttt{\textbackslash tcbhighmath \rightarrow P.364}, one can easily define an independent new box based on \texttt{\textbackslash tcolorbox \rightarrow P.14} which acts like \texttt{\tcbhighmath \rightarrow P.364}:

\begin{empheq}\[box=\otherbox\]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x \, dx
\end{empheq}

\begin{equation}
E = \otherbox{mc^2}
\end{equation}

365
18.2 Option Keys of the Library

\[\text{/tcb/separator sign} \langle \text{sign} \rangle\] (no default, initially :)

The given \langle \text{sign} \rangle is used inside the title text of a theorem as separator between display name combined with number and the specific title text. It is omitted, if there is no specific title text.

% \usepackage{amssymb}
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
}

\textbf{Theorem 18.4 \textendash{} My example}

My theorem text.

\[\text{/tcb/separator sign colon}\] (style, no value, initially set)

Sets \text{/tcb/separator sign} to the default colon : sign.

\[\text{/tcb/separator sign dash}\] (style, no value)

Sets \text{/tcb/separator sign} to an en-dash sign.

\[\text{/tcb/separator sign none}\] (style, no value)

Sets \text{/tcb/separator sign} to empty.

% \usepackage{amssymb}
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
}

\textbf{Theorem 18.5 \textendash{} My example}

My theorem text.

% \usepackage{amssymb}
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
}

\textbf{Theorem 18.6 My example}

My theorem text.
The given \langle \textit{left} \rangle and \langle \textit{right} \rangle delimiter signs are used to frame the descriptive title text of a theorem.

Theorem 18.7: «My example»
My theorem text.

Theorem 18.8: (My example)
My theorem text.

Theorem 18.9: My example
My theorem text.
Sets ⟨text⟩ (e.g., font settings) before the descriptive title text deviating from \textit{/tcb/fonttitle} → P.29. The ⟨text⟩ is removed, if description font is used without value.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}\%
  {colback=white,colframe=red!50!black,fonttitle=\textbf{\itshape},
   description delimiters={\qq}{\rqq},
   description font=\textit{mdseries\itshape}{\theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 18.10: "My example."
My theorem text.

/tcb/description formatter=⟨macro⟩ (default empty, initially empty)
Sets ⟨macro⟩ as formatter for the descriptive title text. The ⟨macro⟩ has to take one mandatory argument (the description text).
Note that \textit{/tcb/description delimiters} → P.367, \textit{/tcb/description color} → P.367, and \textit{/tcb/description font} are ignored, if this option is used.
If description formatter is used without value, the formatter is reset to its standard behavior.

\newtcbox{\formbox}{enhanced,frame empty,size=minimal,boxsep=2pt,arc=1pt,
  on line,interior style image=goldshade.png}
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}\%
  {colback=white,colframe=red!50!black,fonttitle=\textbf{\itshape},
   description formatter=\formbox}{\theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 18.11: My example
My theorem text.

/tcb/terminator sign=⟨sign⟩ (no default, initially empty)
The given ⟨sign⟩ is used as terminator at the end of the title text of a theorem.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}\%
  {colback=white,colframe=red!50!black,fonttitle=\textbf{\itshape},
   terminator sign={.}}{\theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 18.12: My example.
Sets \texttt{/tcb/terminator sign colon} to the colon : sign.

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}
\begin{mytheo}{theo}
\begin{sometheorem}{My example}{myex} My theorem text. \end{sometheorem}
\end{mytheo}
\end{tcbtheorem}

Theorem 18.13 – My example:

My theorem text.

Sets \texttt{/tcb/terminator sign dash} to an en-dash sign.

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}
\begin{mytheo}{theo}
\begin{sometheorem}{My example}{myex} My theorem text. \end{sometheorem}
\end{mytheo}
\end{tcbtheorem}

Theorem 18.14: My example –

My theorem text.

Sets \texttt{/tcb/terminator sign none} to the default empty text.

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}
\begin{mytheo}{theo}
\begin{sometheorem}{My example}{myex} My theorem text. \end{sometheorem}
\end{mytheo}
\end{tcbtheorem}

The given \texttt{\langle\textit{separator}\rangle} is used for labels created with environments which are defined themselves by \texttt{\textbackslash newtcbtheorem}. This \texttt{\langle\textit{separator}\rangle} is put between \texttt{\langle\textit{prefix}\rangle} (defined by \texttt{\textbackslash newtcbtheorem}) and \texttt{\langle\textit{marker}\rangle} (defined by an actual theorem environment).

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}
\begin{mytheo}{theo}
\begin{sometheorem}{My example}{myex} My theorem text. \end{sometheorem}
\end{mytheo}
\end{tcbtheorem}

Theorem 18.15: My example

My theorem text.

See Example~\ref{theo*myex}.

See Example 18.15.
The given ⟨style⟩ is used in connection with labels created with environments which are defined themselves by \newtcbtheorem. This ⟨style⟩ uses one argument which is automatically set to the full label marker of the environment, i.e. a text consisting of ⟨prefix⟩ (defined by \newtcbtheorem), \tcb/label separator → P.369, and ⟨marker⟩ (defined by an actual theorem environment).

A second usage of /tcb/theorem full label supplement overwrites the first setting.

The given ⟨style⟩ is used in connection with labels created with environments which are defined themselves by \newtcbtheorem. This ⟨style⟩ uses one argument which is automatically set to the label ⟨marker⟩ defined by an actual theorem environment.

A second usage of /tcb/theorem label supplement overwrites the first setting, but /tcb/theorem full label supplement and /tcb/theorem label supplement can be used independently.
Sets the hanging indent of the theorem title to `auto` or the given ⟨length⟩. For `auto`, the hanging indent matches the display name, number and separator sign of the theorem. If ⟨length⟩ is negative, the theorem title is indented positively without hanging indent.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}
{colback=white,colframe=red!50!black,fonttitle=\bfseries}{theo}

\begin{sometheorem}{This is a very long and complicated title for a quite short and nearly empty theorem}{myexA1}
My theorem text.
\end{sometheorem}

\begin{sometheorem}[theorem hanging indent=5mm]{This is a very long and complicated title for a quite short and nearly empty theorem}{myexA2}
My theorem text.
\end{sometheorem}

\begin{sometheorem}[theorem hanging indent=0pt]{This is a very long and complicated title for a quite short and nearly empty theorem}{myexA3}
My theorem text.
\end{sometheorem}

\begin{sometheorem}[theorem hanging indent=-5mm]{This is a very long and complicated title for a quite short and nearly empty theorem}{myexA4}
My theorem text.
\end{sometheorem}

Theorem 18.18: This is a very long and complicated title for a quite short and nearly empty theorem

My theorem text.

Theorem 18.19: This is a very long and complicated title for a quite short and nearly empty theorem

My theorem text.

Theorem 18.20: This is a very long and complicated title for a quite short and nearly empty theorem

My theorem text.

Theorem 18.21: This is a very long and complicated title for a quite short and nearly empty theorem

My theorem text.
**Theorem 18.22:** My example

My theorem text.

**18.23 Theorem:** My example

My theorem text.

**Theorem:** My example

My theorem text.

**Theorem:** My example

My theorem text.

**18.25: My example**

My theorem text.
This key can be used directly in a \texttt{tcolorbox} for a more flexible approach to create a theorem type box. The \texttt{display name} is used together with the increased \texttt{counter} value and the \texttt{title} for the title line of the box. Additionally, a \texttt{label} with the given \texttt{marker} is created.

\begin{tcolorbox}[colback=green!10,colframe=green!50!black,arc=4mm,\]
 theorem={Test}{texercise}{Direct usage}{myMarker}\]
\end{tcolorbox}

Here, we see the test \ref{myMarker}.

\begin{tcolorbox}
\textbf{Test 1: Direct usage}

Here, we see the test 1.
\end{tcolorbox}

For a common appearance inside the document, the key \texttt{theorem} should not be used directly as in the example above, but as part of a new environment created by hand or using \texttt{newtcbtheorem} \textsuperscript{P.362}. 
/tcb/highlight math

A style which is used for \texttt{\textbackslash tcbhighmath} \textsuperscript{P.364} and which is predefined as \texttt{notitle,nophantom,colframe=red,colback=yellow!25!white}.

It can be changed with the usual \texttt{pgf} techniques or with \texttt{/tcb/highlight math style}.

\begin{align*}
\texttt{\tcbhighmath}\{1\} + 1 &= 2, \\
\texttt{\tcbset}{highlight math/.append style={left=0mm,right=0mm,top=0mm,bottom=0mm}} &\quad \texttt{\tcbhighmath}\{1\} + 1 &= 2.
\end{align*}

\begin{align*}
1 + 1 &= 2. \\
1 + 1 &= 2.
\end{align*}

\texttt{/tcb/highlight math style=(style definition)} (style, no default)

Changes the definition for \texttt{/tcb/highlight math} to \texttt{notitle,nophantom} plus the given \texttt{<style definition>}. See \texttt{\tcbhighmath \textsuperscript{P.364}} for another example.

\begin{verbatim}
\% \tcbuselibrary{skins}
\tcbset{highlight math style={enhanced,\%<-- needed for the 'remember' options
\quad colframe=red,colback=red!10!white,boxsep=0pt}}
\begin{align*}
\texttt{\tcbhighmath}[\texttt{\textbackslash remember as=f(x)}\{f(x)\}]
\quad &= \int_{1}^{x} \frac{1}{t^2}~dt \\
\quad &= \left[ -\frac{1}{t} \right]_{1}^{x} \\
\quad &= -\frac{1}{x} + \frac{1}{1} \\
\quad &= \texttt{1 - \frac{1}{x}}.
\end{align*}
\end{verbatim}

\[
\begin{array}{c}
f(x) = \int_{1}^{x} \frac{1}{t^2}~dt = \left[ -\frac{1}{t} \right]_{1}^{x} \\
\quad = -\frac{1}{x} + \frac{1}{1} \\
\quad = \texttt{1 - \frac{1}{x}}.
\end{array}
\]
Sets the upper part to mathematical mode with font \textit{\textbackslash displaystyle}.

Sets the lower part to mathematical mode with font \textit{\textbackslash displaystyle}.

Sets the upper part \textit{and} lower part to mathematical mode with font \textit{\textbackslash displaystyle}.

\begin{tcolorbox}[math,colback=yellow!10!white,colframe=red!50!black]
\sum \limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}

The following styles are only tested to work with the original \textit{\textbackslash amsmath} environments. If e.g. the \textit{\textbackslash equation} environment is redefined as \textit{\textbackslash gather}, then \textit{/tcb/ams equation} should \textit{\textbackslash could not} be used. Obviously, you are encouraged to use \textit{/tcb/ams gather} \textit{P.377} in this case.

\begin{tcolorbox}[ams equation,colback=yellow!10!white,colframe=red!50!black]
\sum \limits_{n=1}^{\infty} \frac{1}{n} = \infty. \tag{15}
\end{tcolorbox}

\begin{tcolorbox}[ams equation*,colback=yellow!10!white,colframe=red!50!black]
\sum \limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}
 Adds an amsmath align environment to the start and end of the upper part.

 Adds an amsmath align environment to the start and end of the lower part.

 Adds an amsmath align environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams align, colback=yellow!10!white, colframe=red!50!black]
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{tcolorbox}

 Adds an amsmath align* environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams align*, colback=yellow!10!white, colframe=red!50!black]
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{tcolorbox}
/tcb/ams gather upper  
(Style, no value)  
Adds an amsmath gather environment to the start and end of the upper part.

/tcb/ams gather lower  
(Style, no value)  
Adds an amsmath gather environment to the start and end of the lower part.

/tcb/ams gather  
(Style, no value)  
Adds an amsmath gather environment to the start and end of the upper and lower part.

\begin{tcolorbox}  
[ams gather, colback=yellow!10!white, colframe=red!50!black]  
\sum_{n=1}^{\infty} \frac{1}{n} = \infty.  
\int x^2 \, dx = \frac{1}{3} x^3 + c.  
\end{tcolorbox}

\begin{tcolorbox}  
[ams gather, colback=yellow!10!white, colframe=red!50!black]  
\sum_{n=1}^{\infty} \frac{1}{n} = \infty.  
\int x^2 \, dx = \frac{1}{3} x^3 + c.  
\end{tcolorbox}

/tcb/ams gather* upper  
(Style, no value)  
Adds an amsmath gather* environment to the start and end of the upper part.

/tcb/ams gather* lower  
(Style, no value)  
Adds an amsmath gather* environment to the start and end of the lower part.

/tcb/ams gather*  
(Style, no value)  
Adds an amsmath gather* environment to the start and end of the upper and lower part.

\begin{tcolorbox}  
[ams gather*, colback=yellow!10!white, colframe=red!50!black]  
\sum_{n=1}^{\infty} \frac{1}{n} = \infty.  
\int x^2 \, dx = \frac{1}{3} x^3 + c.  
\end{tcolorbox}

\begin{tcolorbox}  
[ams gather*, colback=yellow!10!white, colframe=red!50!black]  
\sum_{n=1}^{\infty} \frac{1}{n} = \infty.  
\int x^2 \, dx = \frac{1}{3} x^3 + c.  
\end{tcolorbox}
Neutralizes the \abovedisplayskip of a following align or gather environment for the upper part. Note that the text content has to start with such a formula.

Neutralizes the \abovedisplayskip of a following align or gather environment for the lower part. Note that the text content has to start with such a formula.

Neutralizes the \abovedisplayskip of a following align or gather environment for the upper part and lower part. Note that the text content has to start with such a formula.

\begin{tcolorbox}[ams nodisplayskip,colback=yellow!10!white,colframe=red!50!black]
\begin{gather}
\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \\
\int x^2 \, dx = \frac{1}{3} x^3 + c.
\end{gather}
\end{tcolorbox}

\begin{tcolorbox}
\begin{align}
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{align}
\end{tcolorbox}

\begin{align}
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{align}

All described options like /tcb/ams gather upper → P.377, /tcb/ams gather lower → P.377, /tcb/ams gather → P.377 are (partially) setting (overwriting) the keys /tcb/before upper → P.65, /tcb/after upper → P.66, /tcb/before lower → P.67, /tcb/after lower → P.68.

Therefore, e.g. \tcbset{ams gather,before upper={\text{Pythagoras:}}} produces an invalid result. For this case, you are invited to use \tcbset{ams gather,before upper app={\text{Pythagoras:}}}, see /tcb/before upper app → P.432.

378
\texttt{/tcb\theorem style\textasciitilde(name)} \hspace{1cm} (no default, initially \textbf{standard})

Applies a predefined style \textbf{(name)} to the theorem environment. Some of the feasible \textbf{(name)} values resemble style names from the packages \texttt{theorem} and \texttt{ntheorem} to give convenient access to known patterns.

The styles alter \texttt{/tcb\/separator sign} \textsuperscript{P.366}, \texttt{/tcb\/description delimiters} \textsuperscript{P.367}, \texttt{/tcb\/terminator sign} \textsuperscript{P.368}, and more. Therefore, one should apply such keys \textit{after} a theorem style.

For the following examples, we use:

\texttt{/nnewtcbtheorem\[use counter from=mytheo\]{theorem}{Theorem}{%}
fonttitle=\bfseries\upshape,fontupper=\itshape,
colframe=green!50!black,colback=green!10!white,
colbacktitle=green!20!white,coltitle=blue!75!black}{theo}

The predefined styles are:
- \textbf{standard}: This is the initial value.

\begin{theorem}\[theorem style=standard\]{standard}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}\end{theorem}

\textbf{Theorem 18.26: standard}

\begin{theorem}\[theorem style=change\textbf{ standard}\]{change \textbf{ standard}}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}\end{theorem}

\textbf{18.27 Theorem: change standard}

\begin{theorem}\[theorem style=plain\]{plain}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}\end{theorem}

\textbf{plain}

\begin{theorem}\[theorem style=plain\]{plain}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}\end{theorem}

\textbf{Theorem 18.28 (plain): This is my theorem.}

\begin{equation*} a^2 + b^2 = c^2. \end{equation*}
• **break**

\begin{theorem}[theorem style=break]
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

**Theorem 18.29 (break):**
This is my theorem.
\[a^2 + b^2 = c^2.\]

• **plain apart**

\begin{theorem}[theorem style=plain apart]
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

**Theorem 18.30 (plain apart)**
This is my theorem.
\[a^2 + b^2 = c^2.\]

• **change**

\begin{theorem}[theorem style=change]
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

**18.31 Theorem (change):** This is my theorem.
\[a^2 + b^2 = c^2.\]

• **change break**

\begin{theorem}[theorem style=change break]
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

**18.32 Theorem (change break):**
This is my theorem.
\[a^2 + b^2 = c^2.\]

• **change apart**

\begin{theorem}[theorem style=change apart]
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

**18.33 Theorem (change apart)**
This is my theorem.
\[a^2 + b^2 = c^2.\]
• **margin**

\begin{theorem}[theorem style=margin, left=10mm]{margin}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

\begin{theorem}[theorem style=margin, left=10mm, oversize]{margin}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

18.34 Theorem (margin): *This is my theorem.*

\[ a^2 + b^2 = c^2. \]

18.35 Theorem (margin): *This is my theorem.*

\[ a^2 + b^2 = c^2. \]

• **margin break**

\begin{theorem}[theorem style=margin break, left=10mm]{margin break}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

\begin{theorem}[theorem style=margin break, left=10mm, oversize]{margin break}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

18.36 Theorem (margin break):

*This is my theorem.*

\[ a^2 + b^2 = c^2. \]

18.37 Theorem (margin break):

*This is my theorem.*

\[ a^2 + b^2 = c^2. \]

• **margin apart**

\begin{theorem}[theorem style=margin apart, left=10mm]{margin apart}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

\begin{theorem}[theorem style=margin apart, left=10mm, oversize]{margin apart}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

18.38 Theorem (margin apart)

*This is my theorem.*

\[ a^2 + b^2 = c^2. \]

18.39 Theorem (margin apart)

*This is my theorem.*

\[ a^2 + b^2 = c^2. \]
18.3 Examples for Definitions and Theorems

In the following, the application of \newtcbtheorem\textsuperscript{P.362} to highlight mathematical definitions, theorems, or the like is demonstrated.

At first, additional \texttt{tcb} keys are created for the appearance of the colored boxes. It is assumed that theorems and corollaries should be identically colored. All following environments are numbered with a common counter, but this can be changed easily. Here, the counter output is supplemented by the subsection number. Further, the \texttt{cleveref} package [5] is used for clever references.

\begin{Verbatim}
\begin{tcblist}[textwidth=0.9\textwidth, title=\texttt{Definition in the preamble}:]
% \usepackage{cleveref}
\tcbsset{
defstyle/.style={fonttitle=\bfseries\upshape, fontupper=\slshape, arc=0mm, colback=blue!5!white,colframe=blue!75!black},
\theostyle/.style={fonttitle=\bfseries\upshape, fontupper=\slshape, colback=red!10!white,colframe=red!75!black},
}
\newtcbtheorem[number within=subsection,crefname={definition}{definitions}]{Definition}{Definition}{defstyle}{def}
\newtcbtheorem[use counter from=Definition,crefname={theorem}{theorems}]{Theorem}{Theorem}{theostyle}{theo}
\newtcbtheorem[use counter from=Definition,crefname={corollary}{corollaries}]{Corollary}{Corollary}{theostyle}{cor}
\end{tcblist}
\end{Verbatim}

By \newtcbtheorem\textsuperscript{P.362}, commonly numbered theorem environments are created now. \texttt{defstyle} and \texttt{theostyle} are used for the appearance.

Now, everything is prepared for the following examples.

\begin{Verbatim}
\begin{proof}
\begin{tcb}{Theorem}{Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist}{diffbarstetig}
Eine Funktion $f:I\to\mathbb{R}$ ist in $x_0\in I$ stetig, wenn $f$ in $x_0$ differenzierbar ist.
\end{tcb}
\end{proof}
\end{Verbatim}
The following definition is numbered as \Cref{def:diffbarkeit} and referenced with the marker \texttt{def:diffbarkeit}.

\begin{Definition}{Differenzierbarkeit}{diffbarkeit}
Eine Funktion $f: I \to \mathbb{R}$ auf einem Intervall $I$ heißen differenzierbar oder linear approximierbar, wenn der Grenzwert
\begin{equation*}
\lim_{x \to x_0} \frac{f(x)-f(x_0)}{x-x_0} = \lim_{h \to 0} \frac{f(x_0+h)-f(x_0)}{h}
\end{equation*}
existiert. Bei Existenz heißt dieser Grenzwert Ableitung oder Differentialquotient von $f$ in $x_0$ und man schreibt für ihn
\begin{equation*}
f'(x_0) \quad \text{oder} \quad \frac{df}{dx}(x_0).
\end{equation*}
\end{Definition}

The following corollary is numbered as \Cref{cor:nullstellen} and referenced with the marker \texttt{cor:nullstellen}.

\begin{Corollary}{Nullstellenexistenz}{nullstellen}
Ist $f: [a,b] \to \mathbb{R}$ stetig und haben $f(a)$ und $f(b)$ entgegengesetzte Vorzeichen, also $f(a)f(b)<0$, so besitzt $f$ eine Nullstelle $x_0 \in ]a,b[$.
\end{Corollary}

The following corollary is numbered as Corollary 18.3.3 and referenced with the marker cor: nullstellen.

\begin{Corollary}{Nullstellenexistenz}{nullstellen}
Ist $f: [a,b] \to \mathbb{R}$ stetig und haben $f(a)$ und $f(b)$ entgegengesetzte Vorzeichen, also $f(a)f(b)<0$, so besitzt $f$ eine Nullstelle $x_0 \in ]a,b[$, also $f(x_0) = 0$.
\end{Corollary}
Theorem 18.3.4: Hinreichende Bedingung für Wendepunkte

$f$ sei eine auf einem Intervall $[a,b[$ dreimal stetig differenzierbare Funktion. Ist $f''(x_0)=0$ in $x_0 \in ]a,b[$ und $f'''(x_0) \neq 0$, so ist $(x_0,f(x_0))$ ein Wendepunkt von $f$. 

Theorem 18.3.5 (Mittelwertsatz für $n$ Variable)

Es sei $n \in \mathbb{N}, D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x] \subset D$ einen Punkt $\xi \in [x_0,x]$, so dass gilt

$$f(x) - f(x_0) = \text{grad} \, f(\xi)^\top (x-x_0)$$

Here, \texttt{cleveref} support is used to reference \texttt{Theorem 18.3.5} on Page 384. This theorem can also be referenced by \texttt{Vref} resulting in \texttt{Theorem 18.3.5}.

Note that /tcb/label type → P.104 was used in the example above to feed \texttt{cleveref} [5] with the needed name information.
Here, using \(\text{Vref}\) resulting in \(\text{Vref\{theo:meanvaluethm\}}\) is more interesting\ldots

Here, using \(\text{Vref}\) resulting in Theorem 18.3.5 on the preceding page is more interesting...
You need more attention for your theorems? Here, you are ...

\begin{Theorem}[enhanced, fuzzy halo=3mm with yellow, fuzzy halo=2mm with red, fuzzy halo=1mm with yellow, watermark color=red!35!white, watermark text={Overacting\ Fundamental Theorem}]
\begin{center}
\lipsum[1-2]
\end{center}
\end{Theorem}

Overacting Fundamental Theorem

Theorem 18.3.8: Fundamental Theorem of Theorems


Let’s try a more conservative approach:

\begin{YetAnotherTheorem}{Theorem}
\begin{center}
\lipsum[1-2]
\end{center}
\end{YetAnotherTheorem}

Theorem 18.3.9 (Mittelwertsatz für $n$ Variable): Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D, \mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0, x] \subset D$ einen Punkt $\xi \in [x_0, x]$, so dass gilt

\begin{equation*}
f(x) - f(x_0) = \text{grad } f(\xi)^\top (x - x_0)
\end{equation*}
18.4 Using other theorem environments with \texttt{tcolorbox}

Instead of creating theorem environments with the methods described before, environments from other packages can be boxed with a \texttt{tcolorbox}.

Environments may be created e.g. by methods from the \texttt{theorem} package or the \texttt{amsthm} package. \texttt{\textbackslash tcolorboxenvironment \texttt{\textbackslash \texttt{P.17}}} can be used to put a box around these environments.

\begin{definitionpreamble}
\usepackage{amsthm}
\theoremstyle{plain}\% from \texttt{amsthm}'
\newtheorem{lem}{Lemma}\% from \texttt{amsthm}'

\tcolorboxenvironment{lem}{\% from \texttt{amsthm}'}
\begin{lem}
\lipsum[2]
\end{lem}
\lipsum[3]

\begin{proof}\% from \texttt{amsthm}'\end{proof}
\lipsum[4]
\end{proof}


19 Library \texttt{breakable}

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{breakable}
\end{verbatim}

This also loads the package \texttt{pdftex}.

19.1 Technical Overview

The library \texttt{breakable} supports the automatic breaking of a \texttt{tcolorbox}. This feature is enabled by \texttt{/tcb/breakable} \textsuperscript{*P.390} and disabled by \texttt{/tcb/unbreakable} \textsuperscript{*P.391}.

If a \texttt{tcolorbox} is set to be \texttt{/tcb/breakable} \textsuperscript{*P.390}, then the following algorithm is executed:

1. The box content is read to a box register similar but not identical to the unbreakable case.
2. If the total box fits into the current page, it is shipped out visibly unbroken and the algorithm stops.

\begin{itemize}
    \item \textbf{Unbroken Box}
    \begin{description}
        \item The box.
    \end{description}
\end{itemize}

3. Otherwise, it is checked if at least \texttt{/tcb/lines before break} \textsuperscript{*P.391} of the upper box can be placed on the current page. If not, a page break is inserted and the algorithm goes back to Step 2.

4. Now, the \textit{break sequence} starts. The upper box part or the lower box part is split such that it fits into the current page. The fitting part is named \textit{first part} of the \textit{break sequence} and shipped out.

\begin{itemize}
    \item \textbf{Broken Box}
    \begin{description}
        \item The box.
    \end{description}
\end{itemize}

5. If the remaining content of the total box fits into the current page, the algorithm continues with Step 7, else with Step 6.

6. The upper box part or the lower box part is split such that it fits into the current page. The fitting part is named \textit{middle part} of the \textit{break sequence} and shipped out. Then, the algorithm goes back to Step 5.

\begin{itemize}
    \item The box.
\end{itemize}

7. The remaining part is named \textit{last part} of the \textit{break sequence} and shipped out. The algorithm stops.

\begin{itemize}
    \item The box.
\end{itemize}

The algorithm takes care that the optional segmentation line never appears at the end of a box. The optional lower box part is also checked to have at least \texttt{/tcb/lines before break} \textsuperscript{*P.391}.
In principle, all boxes of the break sequence share the same geometric parameters. The differences are:

- The given `/tcb/before` and `/tcb/after` values are used only before the first and after the last part of the break sequence.
- A special behavior between the parts of the break sequence can be given by `/tcb/toprule at break` and `/tcb/bottomrule at break` values, `/tcb/enlarge top at break` and `/tcb/enlarge bottom at break` settings.
- The `/tcb/skin` decides how the first, middle, and last part look like. Actually, every part has its own skin given by the options `/tcb/skin first`, `/tcb/skin middle`, and `/tcb/skin last` settings. Typically, these options are set automatically by the main skin, see Subsection 19.8 from page 404.

### 19.2 Limitations and Known Bugs

- The maximal total height of the upper and of the lower part of normal breakable `tcolorbox`es is about 65536pt (ca. 2300cm) apiece. If such a part gets longer, the output will get buggy without warning. For very oversized boxes which are longer than 65536pt, use the `unlimited` value for `/tcb/breakable`. With the `unlimited` setting, the applied algorithm has (virtually) no height limit for boxes, but very likely the compiler memory will have to be increased for boxes longer than 300 pages (depending on compiler settings and box content). But it is recommended to use `unlimited` for critical large boxes only.

- You can nest an unbreakable `tcolorbox` inside another `tcolorbox`, even inside a breakable one. But you cannot nest a breakable box inside a breakable box. The `/tcb/breakable` key for a nested box is ignored automatically, i.e. inner boxes are always unbreakable. After all, in the unlikely case you really want to have the nested box to be breakable, use `/tcb/enforce breakable` for the nested box. But, a breakable box inside a breakable box will usually give a mess.

- Depending on the E\TeX\ engine, if your text content contains some text color changing commands, your color may not survive the break to the next box. See the documentation for `/tcb/use color stack` for more information.

- The `perpage` option of the `footmisc` package is deliberately deactivated inside a breakable box since all footnotes are placed at the end of the box (possibly far away from the reference point).

- Making a box `/tcb/breakable` which actually is not broken creates a box which acts almost like an unbreakable box. Visual differences are kept as indiscernible as possible, but can appear with certain `/tcb/before` and `/tcb/after` settings, especially, if there is an automatic page break before the box.

- Lua\TeX\ version 0.95 changes the behavior of the basic \texttt{\textbackslash vsplit} (a bug?) resulting in badly broken boxes. Thanks to Jeremy Engel, the \texttt{breakable} library contains a patch for this which also loads the \texttt{ifluatex} package.

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3 Until `tcolorbox` 3.04, the `/tcb/breakable` key was not ignored for nested boxes.

4 `/tcb/enforce breakable` acts like `/tcb/breakable` until `tcolorbox` 3.04.
19.3 Main Option Keys

\texttt{/tcb/breakable}=true|false|unlimited (default true, initially false)

Allows the \texttt{tcolorbox} to be breakable. If the box is larger than the available space at the current page, the box is automatically broken and continued to the next page. All sorts of \texttt{tcolorbox} can be made breakable. It depends on the skin how the breaking looks like. If you do not know better, use \texttt{/tcb/enhanced} \textsuperscript{P.218} for breaking a box. The parts of the \texttt{break sequence} are numbered by the counter \texttt{tcbbreakpart}.

- \texttt{false}: Sets the \texttt{tcolorbox} to be unbreakable.
- \texttt{true}: Breaks the \texttt{tcolorbox} from one page to another. The maximal total height of the upper and of the lower part is about 65536pt (ca. 2300cm or ca. 90 pages) apiece.
- \texttt{unlimited}: Experimental code for unlimited total height of breakable boxes. For boxes longer than 300 pages (or even shorter ones) the compiler memory will have to be increased.

\begin{verbatim}
\% \usepackage{lipsum} % preamble
\tcbset{enhanced jigsaw,colback=red!5!white,colframe=red!75!black, watermark color=yellow!25!white,watermark text=\arabic{tcbbreakpart},
fonttitle=\bfseries}

\begin{tcolorbox}[breakable,title=My breakable box]
\lipsum[1-6]
\end{tcolorbox}
\end{verbatim}

My breakable box


/tcb/unbreakable (no value, initially set)

Sets the tcolorbox to be unbreakable.

/tcb/enforce breakable (no value)

A tcolorbox inside a tcolorbox is automatically set to be unbreakable. Using /tcb/breakable \textit{P.390} on such an inner box has no effect. If one \textit{really} wants the inner box to be breakable, use /tcb/enforce breakable. \textbf{This will usually give a mess of shattered boxes. You are advised to not use this option.}

Note that /tcb/enforce breakable has the functionality that /tcb/breakable \textit{P.390} had until package version 3.04 and exists for backward compatibility.

/tcb/title after break=\langle text\rangle (no default, initially empty)

The /tcb/title \textit{P.18} is used only for the first part of a break sequence. Use title after break to create a heading line with \langle text\rangle as content for all following parts. Also see /tcb/extras title after break \textit{P.398} for formatting the title text.

/tcb/notitle after break (no value, initially set)

Removes the title line or following parts in a break sequence if set before.

/tcb/adjusted title after break=\langle text\rangle (style, no default, initially unset)

Works like /tcb/adjusted title \textit{P.18} but applied to /tcb/title after break.

/tcb/lines before break=\langle number\rangle (no default, initially 2)

Assures that the given \langle number\rangle of lines of the upper box part or the lower box part are placed before a break happens.
\texttt{/tcb/break at}=(\texttt{length})/\langle \texttt{length} \rangle/\ldots/\langle \texttt{length} \rangle \quad (\text{no default, initially 0pt})

Defines break points at the given \langle \texttt{length} \rangle values. The first \langle \texttt{length} \rangle defines the (maximal) height of the first partial box, the second \langle \texttt{length} \rangle defines the (maximal) height of the second partial box, and so on. The last \langle \texttt{length} \rangle value is applied to all following partial boxes if any.

- Setting a \langle \texttt{length} \rangle to \texttt{Opt} means that the naturally available space is used for breaking.
- Setting a \langle \texttt{length} \rangle to a negative value means that the sum of this negative value and the naturally available space is used for breaking (boxes will shrink in height). Note that before version 4.10 negative values were treated like \texttt{Opt}.

\begin{tcolorbox}
[enhanced jigsaw, size=small, vfill before first, colframe=red, colback=yellow!10!white, before title=\raggedright, title={Broken box inside a \texttt{multicols} environment}, fonttitle=\bfseries, enforce breakable, % use only breakable in the real world! pad at break=1mm, break at=3cm/6.3cm ]
\lipsum[1]
\end{tcolorbox}

\texttt{/tcb/height fixed for} may also be considered for \texttt{multicols} environments.

\texttt{/tcb/enlargepage}=(\texttt{length})/\langle \texttt{length} \rangle/\ldots/\langle \texttt{length} \rangle \quad (\text{no default, initially 0pt})

Inserts a \texttt{enlargethispage}{\langle \texttt{length} \rangle} to the pages of the break sequence, i.e. allows one to enlarge (or shrink) partial boxes. The first \langle \texttt{length} \rangle is applied to the first partial box, the second \langle \texttt{length} \rangle is applied to the second partial box, and so on. The last \langle \texttt{length} \rangle value is applied to all following partial boxes if any. Note that floating boxes will not be enlarged.

\texttt{The example code enlarged the second partial box by one line, the third partial box by two lines, and all following parts are not enlarged.}

\begin{tcolorbox}[breakable, enlargepage=0mm/\baselineskip/2\baselineskip/0mm,...]
\end{tcolorbox}

If an automated page break occurs before the first partial box, the page enlargement is applied to the page before the first partial box \textit{and} again to the page of the first partial box. Insert a manual break to prevent this. In general, \texttt{enlargepage} should be used at the final stage of a document for fine-tuning only.
\texttt{/tcb/enlargepage flexible=$\langle$\textit{length}$\rangle$} \hspace{1em} (no default, initially \texttt{0pt})

This allows an automated page enlargement for up to \texttt{$\langle$\textit{length}$\rangle$}. The algorithm can use this to avoid breaking a box, if there is enough room after enlargement. Also, the \textit{last} partial box of a break sequence may be enlarged to avoid further breaking.

Note that this potential enlargement is \textit{additive} to settings of \texttt{/tcb/enlargepage} \textsuperscript{P.392}. But \texttt{/tcb/enlargepage flexible} overwrites settings of \texttt{/tcb/pad before break*} \textsuperscript{P.395} or \texttt{/tcb/pad at break*} \textsuperscript{P.395}.

\begin{verbatim}
% The following setting hinders orphan lines for the last partial box
\tcbset{enlargepage flexible=\baselineskip}
\end{verbatim}

\texttt{/tcb/compress page=$\langle$\textit{option}$\rangle$} \hspace{1em} (default \texttt{all}, initially \texttt{baselineskip})

This option controls the space management on the page which contains the unbroken box or the first part of a \textit{break sequence}. Feasible \textit{(option)} values are:

- \texttt{all} (default value): All shrinkable glue on the page is potentially used for the unbroken box or the first part of a \textit{break sequence}. Thus, all vertical spaces on the page will potentially be reduced to their minimal values.
- \texttt{baselineskip} (initial value): Shrinkable glue up to one \texttt{\baselineskip} on the page is potentially used for the unbroken box or the first part of a \textit{break sequence}.
- \texttt{none}: The break algorithm respects the target size of the given glue values on the page. This was the initial value before version 3.34.

\begin{Caution}Note that the box \textit{content} is not influenced by this option.\end{Caution}

\texttt{/tcb/shrink break goal=$\langle$\textit{length}$\rangle$} \hspace{1em} (no default, initially \texttt{0pt})

This is an emergency parameter if the break algorithm produces unpleasant breaks. It shrinks the goal height of the current box part by \texttt{$\langle$\textit{length}$\rangle$} which may result in smaller boxes. Never use negative values. \textit{Usually, this option will never be needed at all.}

\texttt{/tcb/use color stack=true|false} \hspace{1em} (default \texttt{true}, initially \texttt{false})

Depending on the \LaTeX{} engine and loaded packages, if your text contains some color changing commands, your color may not survive the break to the next box. For some engines, there is support for additional color stacks which allow colors to survive breaks. Such an color stack can be activated by \texttt{/tcb/use color stack} with help of the \texttt{pdfcol} package. This can be done globally or per box.

\texttt{Note that activating \texttt{/tcb/use color stack} inserts a color command with a \texttt{whatsit} at the beginning of the upper part and of the lower part of a \texttt{tcolorbox*}} \textsuperscript{P.12}. This \textit{may} add additional vertical space, e.g. if your box text starts with a list like \texttt{enumerate}!

- \texttt{pdf\TeX}: color stacks supported.
- \texttt{Lua\TeX}: color stacks supported, but you should consider loading the \texttt{luacolor} package \textit{instead} which avoids the spacing problem.
- \texttt{Xe\TeX}: color stacks not supported (yet?). From hearsay, with the \texttt{fontspec} package, you may use \texttt{\addfontfeatures{Color=mycolor}} to add a font color which survives the break.

\textit{If} \texttt{pdfcol} \textit{cannot} initialize an additional color stack for the used engine, \texttt{/tcb/use color stack} is silently ignored.
Breakable box without color stack.

• Some blue text.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspen-


More blue text.

Text after box.

We do again with /tcb/use color stack P.393. Observe the additional spacing at the begin of the box:

Breakable box with color stack.

• Some blue text.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspen-


More blue text.

Text after box.
19.4 Option Keys for the Break Appearance

/tcb/toprule at break=(length) (no default, initially 0.5mm)

Sets the line width of the top rule to \( \langle \text{length} \rangle \) if the box is /tcb/breakable \( \rightarrow \) P.390. In this case, it is applied to middle and last parts in a break sequence. Note that /tcb/toprule \( \rightarrow \) P.35 overwrites this value if used afterwards.

/tcb/bottomrule at break=(length) (no default, initially 0.5mm)

Sets the line width of the bottom rule to \( \langle \text{length} \rangle \) if the box is /tcb/breakable \( \rightarrow \) P.390. In this case, it is applied to first and middle parts in a break sequence. Note that /tcb/bottomrule \( \rightarrow \) P.35 overwrites this value if used afterwards.

/tcb/topsep at break=(length) (no default, initially 0mm)

Additional vertical space of \( \langle \text{length} \rangle \) which is added at the top of middle and last parts in a break sequence. In general, it is not advisable to change this value if these parts start with a rule or a title.

/tcb/bottomsep at break=(length) (no default, initially 0mm)

Additional vertical space of \( \langle \text{length} \rangle \) which is added at the bottom of first and middle parts in a break sequence. In general, it is not advisable to change this value if these parts end with a rule.

/tcb/pad before break=(length) (style, no default, initially 3.5mm)

Sets the total amount of vertical space after the text content and before the break point to \( \langle \text{length} \rangle \). This style sets /tcb/toprule at break to 0pt and changes /tcb/topsep at break as required. In general, it is not advisable to change this value if these parts end with a rule.

/tcb/pad before break*=(length) (style, no default)

Sets /tcb/pad before break to \( \langle \text{length} \rangle \) and /tcb/enlargepage flexible \( \rightarrow \) P.393 to an appropriate value such that empty closing frames are avoided.

/tcb/pad after break=(length) (style, no default, initially 3.5mm)

Sets the total amount of vertical space after the break point and before the text content to \( \langle \text{length} \rangle \). This style sets /tcb/bottomrule at break to 0pt and changes /tcb/bottomsep at break as required. In general, it is not advisable to change this value if the first and middle parts in a break sequence end with a rule.

/tcb/pad at break=(length) (style, no default, initially 3.5mm)

Abbreviation for setting \( \langle \text{length} \rangle \) to /tcb/pad before break and /tcb/pad after break.

/tcb/pad at break*=(length) (style, no default)

Sets /tcb/pad at break to \( \langle \text{length} \rangle \) and /tcb/enlargepage flexible \( \rightarrow \) P.393 to an appropriate value such that empty closing frames are avoided.

\begin{tcolorbox}
\begin{itemize}
\item \texttt{\textbackslash tcbset\{colback=red!5!white,\textbackslash colframe=red!75!black,\textbackslash fonttitle=\bfseries\}}
\end{itemize}
\end{tcolorbox}

\begin{tcolorbox}
\begin{itemize}
\item \texttt{\textbackslash begin\{tcolorbox\}\{enhanced\ jigsaw\,breakable\,pad\ at\ break*\=0mm,\}}
\item \texttt{title=\{For \textit{this} box, the \textit{pad space at the break point is set to 0mm}\}\}}
\end{itemize}
\end{tcolorbox}

For this box, the pad space at the break point is set to 0mm


[tcb/pad at break]/*P.395 or [tcb/pad at break]*/P.395 should be used as very last option in an option list, because they adapt other settings.

Also see [tcb/enlarge top at break] by */P.89 and [tcb/enlarge bottom at break] by */P.89.

[tcb/height fixed for]={(part)} (no default, initially none)

When certain amount of space is available for a partial box of a break sequence, the partial box typically is smaller than this space (depending on the box content). For given (part)(s), the height can be set to all available space.

- **none**: Every partial tcolorbox is set with its natural height.
- **first**: The first partial box is set to a height which matches the available space.
- **middle**: All middle partial boxes are set to a height which matches the available space.
- **last**: The last partial box is set to a height which matches the available space.
- **first and middle**: The first and all middle partial boxes are set to a height which matches the available space.
- **middle and last**: All middle partial boxes and the last partial box are set to a height which matches the available space.
- **all**: All partial boxes are set to a height which matches the available space.

If the box keeps unbroken, this option is not applied. See [tcb/height]*/P.53 for setting a fixed height for unbroken boxes. See [tcb/height fill]*/P.56 for giving unbroken boxes maximum height.

[tcb/vfill before first] = true|false (default true, initially false)

Inserts a \vfill at the begin of the first partial box to move this partial box to the end of the current page. This may be used as an alternative to [tcb/height fixed for] first to get justified columns or pages. The \vfill is not inserted, if the box gets not actually broken.

[tcb/segmentation at break] = true|false (default true, initially true)

If a breakable box contains an upper part and a lower part and the break happens at the segmentation between both parts, then

- the segmentation line (or similar) is drawn as first element of the partial box containing the lower part, if [tcb/segmentation at break] is set to be true.
- the segmentation line (or similar) is not drawn at all, if [tcb/segmentation at break] is set to be false. This may be preferable for skins like bicolor*/P.230, tile*/P.240, or beamer*/P.244.

396
19.5 Extra Options for Partial Boxes

N 2015-07-16 /tcb/extras*={⟨options⟩}  (no default, initially unset)

Adds \texttt{tcolorbox} \langle options \rangle to every box of a break sequence after skin settings are done. This is quite late in box processing. Geometry and break settings should \textit{not be used} here, because they will either be ignored or have unexpected negative results. But it is possible to change most colors, skin effects, shadows, borders, frame code, etc. Note that using \texttt{/tcb/extras} for every box is very seldom an advantage over setting the options directly. Usually, \texttt{/tcb/extras first}, \texttt{/tcb/extras middle}, etc. are sensible to apply.

N 2015-07-16 /tcb/no extras  (style, no default, initially set)

Removes all extras if set before.

N 2015-07-16 /tcb/extras broken*={⟨options⟩}  (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable \textsuperscript{P.390}} and \textit{is} broken actually, then the \langle options \rangle are added to every box of the break sequence. \texttt{/tcb/extras} overwrites this key.

N 2015-07-16 /tcb/extras unbroken*={⟨options⟩}  (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable \textsuperscript{P.390}} but \textit{is not} broken actually or if the box is set to be \texttt{/tcb/unbreakable \textsuperscript{P.391}}, then the \langle options \rangle are added to the box. \texttt{/tcb/extras} overwrites this key.

N 2015-07-16 /tcb/no extras unbroken  (style, no default, initially set)

Removes the unbroken extras if set before.

N 2015-07-16 /tcb/extras first*={⟨options⟩}  (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable \textsuperscript{P.390}} and \textit{is} broken actually, then the \langle options \rangle are added to the \textit{first} box of the break sequence. \texttt{/tcb/extras} overwrites this key.

N 2015-07-16 /tcb/no extras first  (style, no default, initially set)

Removes the first extras if set before.

N 2015-07-16 /tcb/extras middle*={⟨options⟩}  (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable \textsuperscript{P.390}} and \textit{is} broken actually, then the \langle options \rangle are added to every \textit{middle} box (if any) of the break sequence. \texttt{/tcb/extras} overwrites this key.

N 2015-07-16 /tcb/no extras middle  (style, no default, initially set)

Removes the middle extras if set before.

N 2015-07-16 /tcb/extras last*={⟨options⟩}  (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable \textsuperscript{P.390}} and \textit{is} broken actually, then the \langle options \rangle are added to the \textit{last} box of the break sequence. \texttt{/tcb/extras} overwrites this key.

N 2015-07-16 /tcb/no extras last  (style, no default, initially set)

Removes the last extras if set before.

N 2015-07-16 /tcb/extras unbroken and first*={⟨options⟩}  (no default, initially unset)

This is an abbreviation for setting \texttt{/tcb/extras unbroken} and \texttt{/tcb/extras first} together. \texttt{/tcb/extras} overwrites this key.

N 2015-07-16 /tcb/extras middle and last*={⟨options⟩}  (no default, initially unset)

This is an abbreviation for setting \texttt{/tcb/extras middle} and \texttt{/tcb/extras last} together. \texttt{/tcb/extras} overwrites this key.

N 2015-07-16 /tcb/extras unbroken and last*={⟨options⟩}  (no default, initially unset)

This is an abbreviation for setting \texttt{/tcb/extras unbroken} and \texttt{/tcb/extras last} together. \texttt{/tcb/extras} overwrites this key.
/tcb/extras first and middle={⟨options⟩} (no default, initially unset)

This is an abbreviation for setting /tcb/extras first→P.397 and /tcb/extras middle→P.397 together. /tcb/extras→P.397 overwrites this key.

/tcb/extras title after break={⟨options⟩} (no default, initially unset)

If the box has a /tcb/title after break→P.391, then the ⟨options⟩ are added for all titles after the first break, i.e. all middle and last. The color, font, and alignment of titles after break can be adapted choosing ⟨options⟩, e.g. by /tcb/coltitle→P.28, /tcb/fonttitle→P.29, /tcb/halign title→P.32. Note that /tcb/colbacktitle→P.27 has to be placed into /tcb/extras middle and last→P.397.

/tcb/no extras title after break (style, no default, initially set)

Removes the title after break extras if set before.
\newtcolorbox{mybox}[1][]{tile,
  colback=green!7,coltitle=blue!50!black,colbacktitle=blue!5,
  center title,
  toprule=1.25mm,bottomrule=1.25mm,
  extras unbroken and first={
    borderline north={0.25mm}{0.5mm}{blue,decoration={zigzag,amplitude=0.5mm},decorate},
  }
  extras unbroken and last={
    borderline south={0.25mm}{0.5mm}{blue,decoration={zigzag,amplitude=0.5mm},decorate},
  }
  #1
}

\begin{mybox}[title=My unbroken box]
\lipsum[1]
\end{mybox}

\begin{multicols}{3}
\begin{mybox}[title=My broken box,
  enforce breakable,% use only breakable in the real world!
  break at=4.2cm,pad at break=2mm,
  height fixed for=first and middle, ]
\lipsum[2]
\end{mybox}
\end{multicols}

My unbroken box


My broken box

19.6 Breakable boxes and the multicol package

With version 4.10, the algorithm for detecting the available height for a tcolorbox inside a multicol environment was improved with help of Frank Mittelbach. This change may impact existing user code which may have to be adapted.

Unbreakable tcolorboxes can be used without special care inside a multicol environment from the multicol package [9]. Since version 3.10, a breakable tcolorbox detects, if it is used inside a multicol environment. But choosing break points for a breakable box cannot be done by the balancing routine of multicol. By default, boxes will break at maximum column height. To get pleasant results, use the /tcb/break at \[P.392\] and /tcb/height fixed for \[P.396\] options.

\[
\begin{multicols}{2}
\lipsum[1]
\begin{tcolorbox}[enhanced jigsaw,breakable,size=title,
    colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
    title=My breakable box,pad at break=1mm, break at=-\baselineskip/0pt ]
\lipsum[2-4]
\end{tcolorbox}
\lipsum[4]
\end{multicols}
\]


**My breakable box**


This example is already set inside a \texttt{multicols} environment. This time, a \texttt{middle} part has full column height (here \texttt{\textwidth}). /text\ height\ fixed for\ ^{P.396} is used to spread this box part over the full height to align with neighboring columns.

\begin{tcolorbox}[enhanced jigsaw, breakable, size=title, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries, title=My breakable box, pad at break=2mm, break at=-\baselineskip/0pt, height fixed for=middle ]
\lipsum[2-7]
\end{tcolorbox}

\lipsum[8]


semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Proin et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus.


The following example has a \textcolorbox which fills the \multicols environment completely. Here, /tcb/height fixed for → P.396 is used to give all three columns the full height. Note that the appropriate /tcb/break at → P.392 value is not computed automatically but set manually.

\begin{multicols}{3}
\small
\begin{tcolorbox}
\[enhanced jigsaw,breakable,size=small, colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, title=My breakable box,pad at break=2mm,drop fuzzy shadow, height fixed for=all, break at=11.4cm]\]
\lipsum[1-3]
\end{tcolorbox}
\end{multicols}

My breakable box


19.7 Break Point Insertion

A breakable box is not broken, if there is enough space on the current page or column. Therefore, typical penalty insertion with \break, \pagebreak, \columnbreak, ... may only work as expected, if the box is broken at least into two parts without inserting the penalties.

To force a page or column break, \tcbbreak starts a new paragraph and inserts an insane tall rule which causes a break and which is immediately discarded. You may ignore this technical information and just use it as you would use \pagebreak.

For an unbreakable box, \tcbbreak is identical to insert \par, i.e. it just starts a new paragraph.

Also see \texttt{/tcb/break} at \texttt{P.392} for defining height dependend breaks.

\begin{multicols}{3}
\begin{tcolorbox}[breakable,enhanced jigsaw,size=small, colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, title=Break into parts]
First part \tcbbreak
Second part \tcbbreak
Third part
\end{tcolorbox}
\end{multicols}

\begin{multicols}{3}
\begin{tcolorbox}[enhanced jigsaw,size=small, colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, title=You shall not break]
First part \tcbbreak
Second part \tcbbreak
Third part
\end{tcolorbox}
\end{multicols}
19.8 Break Sequence for the Skins

The following diagrams document the *break sequence* for different skins. Depending on the main skin of a `tcolorbox`, the actual skins of the *break sequence* parts are displayed.

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=standard</td>
<td>skin=standard</td>
</tr>
<tr>
<td></td>
<td>skin=standard</td>
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<tr>
<td></td>
<td>skin=standard</td>
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</tbody>
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<table>
<thead>
<tr>
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<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
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<td>skin=standard jigsaw</td>
<td>skin=standard jigsaw</td>
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<td></td>
<td>skin=standard jigsaw</td>
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<td>skin=standard jigsaw</td>
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<table>
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<td>skin=spartan</td>
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<tr>
<td></td>
<td>skin=spartan</td>
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<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>skin=enhanced jigsaw</td>
<td>skin=enhancedfirst jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast jigsaw</td>
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<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
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<td>skin=enhancedmiddle jigsaw</td>
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<td>skin=enhancedmiddle jigsaw</td>
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<td>Unbroken Box</td>
<td>Broken Boxes</td>
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</tr>
<tr>
<td>skin=bicolor</td>
<td>skin=bicolorfirst</td>
</tr>
<tr>
<td></td>
<td>skin=bicolormiddle</td>
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<tr>
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<td>skin=tilelast</td>
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410
Unbroken Box

- skin=beamer

Broken Boxes

- skin=beamerfirst
- skin=beamermiddle
- skin=beamermiddle
- skin=beamermiddle

Unbroken Box

- skin=beamerfirst

Broken Boxes

- skin=beamerfirst
- skin=beamermiddle
- skin=beamermiddle

Unbroken Box

- skin=beamermiddle

Broken Boxes

- skin=beamermiddle
- skin=beamermiddle
- skin=beamermiddle

Unbroken Box

- skin=beamerlast

Broken Boxes

- skin=beamermiddle
- skin=beamermiddle
- skin=beamerlast
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<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=freelance</td>
<td>skin=freelancefirst</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancelast</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=freelancefirst</td>
<td>skin=freelancefirst</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=freelancemiddle</td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>skin=freelancelast</td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancelast</td>
</tr>
</tbody>
</table>
19.9 Break by Hand (Faked Break)

See Section 19.6 on page 400 for real column breaks.

Since the appearance of broken boxes is done by skins, it is quite easy to 'fake a break'. For this, you actually don’t need the \texttt{breakable} library at all.

\begin{tcbox}[title=My broken box,skin=enhancedfirst]
This is a box which breaks from one column to another
\end{tcbox}
\hfill
\begin{tcbox}[skin=enhancedmiddle]
column. I am sorry to say that this is a trick. Nevertheless, you may use this trick for your
\end{tcbox}
\hfill
\begin{tcbox}[skin=enhancedlast]
own purposes.
\end{tcbox}
The main purpose of this library is to store a \texttt{tcolorbox} into an array of box registers for later usage.

If the \texttt{tcolorbox} is not breakable, there is not much add-on compared to usual \TeX/\LaTeX\ box storage and usage (and you do not really need this library for that use case). For a breakable \texttt{tcolorbox}, this library allows to capture all partial boxes into a sequence of registers. The partial boxes can be used anywhere in arbitrary order.

The name of this library indicates \textit{magazine} in the sense of storage, but also in the sense of a journal where an article often is continued on page \textit{x}. An example for this kind of application is given throughout this section starting on the right hand side. The creation of this library was motivated by Ulrike Fischer and Steven B. Segletes.

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{magazine}
\end{verbatim}

This also loads the library \texttt{breakable}, see Section 19 on page 388.

The box register operations of this library are global. \TeX\ grouping will not clear the registers when leaving the current group. Also be aware that extensive use of large box arrays may eat up \TeX\’s available memory and registers.

\section{Creation and Resetting of Box Arrays}

\begin{verbatim}
\newboxarray{⟨name⟩}
\end{verbatim}

This creates a new box array called \texttt{⟨name⟩}. There already is a box array available with name \texttt{default} which can be used directly. Note that the creation is a global operation.

\begin{verbatim}
\newboxarray{myarray}
\end{verbatim}

\begin{verbatim}
\boxarrayreset{⟨name⟩}
\end{verbatim}

Resets the size counter of a box array \texttt{⟨name⟩} to zero. If \texttt{⟨name⟩} is not provided, \texttt{default} is used as name. Use this or \texttt{/tcb/reset box array} before you apply \texttt{/tcb/store to box array} \textsuperscript{P.416}. Otherwise, all boxes would be appended to the already existing boxes. This command does not clear box registers.

\begin{verbatim}
\tcbset{
  reset box array, \% resets 'default'
  reset box array=myarray, \% resets 'myarray'
}
\end{verbatim}
\texttt{\textbackslash boxarrayclear[(name)]}

Works like \texttt{\textbackslash boxarrayreset} \cite{P.415} to reset the size counter of a box array \langle name \rangle to zero. Additionally, all allocated box registers of the box array are cleared of their content. Note that the allocated box registers stay allocated. So, this may be useful to clear memory, but not to free registers for other applications. If \texttt{\textbackslash consumeboxarray} \cite{P.419} or \texttt{\textbackslash consumetcboxarray} \cite{P.419} was used to apply the stored boxes, there is no advantage in using \texttt{\textbackslash boxarrayclear}.

\begin{tcolorbox}
\begin{tabular}{c}
\texttt{\textbackslash boxarrayclear} \hfill \% clears \texttt{\textquotesingle default\textquotesingle} \\
\texttt{\textbackslash boxarrayclear\{myarray\}} \hfill \% clears \texttt{\textquotesingle myarray\textquotesingle}
\end{tabular}
\end{tcolorbox}

20.2 Storing Content

\texttt{\textbackslash tcb\textbackslash store to box array=(name)} \hspace{1cm} (default default, initially unset)

Stores a \texttt{tcolorbox} or all parts of a break sequence of a \texttt{tcolorbox} into a box array \langle name \rangle. If no \langle name \rangle is given, the already existing \texttt{default} box array is used. Otherwise, the box array has to be created beforehand with \texttt{\newboxarray} \cite{P.415}. Note that the box has to be \texttt{\textbackslash tcb\textbackslash breakable} \cite{P.390}, if the box shall break into several parts. Typically, manual break points are additionally defined by \texttt{\textbackslash tcb\textbackslash break at} \cite{P.392}. Otherwise, the box parts will have a length of about \texttt{\textbackslash textheight}. For most use cases, a \texttt{\textbackslash tcb\textbackslash reset box array} \cite{P.415} should be applied to reset the box array counter.

\begin{example}
% \usepackage{lipsum}
\begin{tcolorbox}
\begin{tabular}{b}{cc}
\multicolumn{2}{c}{\includegraphics[width=7cm]{Basilica_5.png}}
\end{tabular}
\end{tcolorbox}
\useboxarray{1} & \useboxarray{2} & \useboxarray{3}
\end{example}

If the first box part should fill the rest of the available space of the current page, you can use \pagegoal-\pagetotal minus some distance for the first element of /tcb/break at P.392. You may want to have some additional distance to the preceding text.

\begin{tcolorbox}[enhanced,breakable, reset box array, store to box array, break at=\pagegoal-\pagetotal-5mm/0pt, height fixed for=first and middle]
\lipsum[1-15]
\end{tcolorbox}

\begin{tcolorbox}[blanker,width=4cm, fontupper=\footnotesize, enforce breakable, % use only breakable in the real world! break at=4cm, height fixed for=all, watermark text=\arabic{tcbbreakpart}, reset box array, store to box array]
\includegraphics[width=\linewidth]{Basilica_5.png}
\lipsum[1-2]
\end{tcolorbox}

\begin{tcbitemize}[raster columns=3,raster equal height, size=small, halign=center, sharp corners, colback=blue!5]
\tcbitem\consumeboxarray{5}
\tcbitem\consumeboxarray{6}
\tcbitem\consumeboxarray{1}
\tcbitem\consumeboxarray{2}
\tcbitem\consumeboxarray{3}
\tcbitem\consumeboxarray{4}
\end{tcbitemize}
\begin{boxarraystore}{\langle name \rangle}
\langle \text{environment content} \rangle
\end{boxarraystore}

Stores the environment content into a box array \langle name \rangle. This corresponds to the standard L\TeX environment \texttt{lrbox}, but the storage operation is global. As long as \texttt{\boxarrayreset} \rightarrow \texttt{P.415} is not used, every new \texttt{boxarraystore} adds a further box to the array.

\begin{verbatim}
\boxarrayreset
\begin{boxarraystore}{default}\fbox{Mary}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{Had}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{a}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{Little}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{Lamb}\end{boxarraystore}
\useboxarray\{5\}
\useboxarray\{4\}
\useboxarray\{3\}
\useboxarray\{2\}
\useboxarray\{1\}\hfill
\useboxarray\{1\}
\useboxarray\{5\}
\end{verbatim}

\begin{tabular}{llll}
  Lamb & Little & a & Had & Mary
\end{tabular}

20.3 Retrieving Content

\texttt{\boxarraygetsize}\langle name \rangle\{\langle macro \rangle\}

Stores the current size of a box array \langle name \rangle into a given \langle macro \rangle. If no \langle name \rangle is given, the already existing \texttt{default} box array is used.

\begin{verbatim}
\boxarraygetsize\{\mysize\}
\foreach \n in \{1,...,\mysize\} {
  \useboxarray\{\n\}
}\end{verbatim}

Current size of the default box array: 5.

\texttt{\useboxarray}\langle name \rangle\{\langle index \rangle\}

Typesets the box with the given \langle index \rangle number from the box array \langle name \rangle. If no \langle name \rangle is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \langle name \rangle is used. It is silently ignored, if the \langle index \rangle is out of range. Note that \texttt{\useboxarray} corresponds to the standard \texttt{\usebox} macro, respectively, \texttt{\copy}.
\usetcboxarray{(name)}{(index)}{(options)}

Typesets the box with the given \textit{index} number from the box array \textit{name} using \texttt{useboxarray} \textsuperscript{P.418} as content of a \texttt{tcbox} \textsuperscript{P.14}. If no \textit{name} is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \textit{name} is used. It is silently ignored, if the \textit{index} is out of range. The \texttt{tcbox} \textsuperscript{P.14} can be customized by \texttt{tcolorbox} \textit{(options)}.

\begin{verbatim}
\boxarraygetsize{\mysize}
\foreach \n in {1,...,\mysize} { \usetcboxarray{\n}{on line,colframe=yellow, colback=yellow!10} }
\end{verbatim}

\begin{tabular}{lllll}
Mary & Had & a & Little & Lamb
\end{tabular}

\texttt{\consumeboxarray{(name)}{(index)}}

Typesets the box with the given \textit{index} number from the box array \textit{name}. If no \textit{name} is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \textit{name} is used. It is silently ignored, if the \textit{index} is out of range. In contrast to \texttt{useboxarray} \textsuperscript{P.418}, \texttt{consumeboxarray} corresponds to the standard \texttt{box} macro, i.e. after typesetting the box register is cleared and cannot be used again.

\begin{verbatim}
\boxarraygetsize{\mysize}
First run: \foreach \n in {1,...,\mysize} { \consumeboxarray{\n} }
\par
Second run: \foreach \n in {1,...,\mysize} { \consumeboxarray{\n} }
\end{verbatim}

First run: Mary Had a Little Lamb
Second run: Mary Had a Little Lamb

\texttt{\consumetcboxarray{(name)}{(index)}{(options)}}

Typesets the box with the given \textit{index} number from the box array \textit{name} using \texttt{consumeboxarray} as content of a \texttt{tcbox} \textsuperscript{P.14}. If no \textit{name} is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \textit{name} is used. It is silently ignored, if the \textit{index} is out of range. The \texttt{tcbox} \textsuperscript{P.14} can be customized by \texttt{tcolorbox} \textit{(options)}. After typesetting the box register is cleared and cannot be used again.

--- continued from page 418 ---

The linking texts like \textit{continued on page x} are created by \texttt{/tcb/finish} \textsuperscript{P.206} commands for the embedding \texttt{tcbox} \textsuperscript{P.14}. To label the box parts, \texttt{/tcb/phantomlabel} \textsuperscript{P.104} is used. These quite small partial boxes are --- continued on page 422 ---


Assigns the box with the given \langle index\rangle number from the box array \langle name\rangle to a \langle macro\rangle. If no \langle name\rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name\rangle is used. If the \langle index\rangle is out of range, the \langle macro\rangle will be undefined.

Tests the box with the given \langle index\rangle number from the box array \langle name\rangle for emptiness be empty and executes \langle true\rangle if it is empty, and \langle false\rangle otherwise. If no \langle name\rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name\rangle is used.
20.4 Box Dimensions

Assigns the width of the box with the given \langle index \rangle number from the box array \langle name \rangle to a \langle macro \rangle. If no \langle name \rangle is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \langle name \rangle is used. If the \langle index \rangle is out of range, the \langle macro \rangle will be set to 0pt.

\begin{tabular}{ll}
\useboxarray \{1\} & width of box 1: \boxarraygetwidth \mylen \mylen \\
\useboxarray \{2\} & width of box 2: \boxarraygetwidth \mylen \mylen \\
\end{tabular}

Test width of box 1: 30.35799pt
width of box 2: 0pt

Assigns the height of the box with the given \langle index \rangle number from the box array \langle name \rangle to a \langle macro \rangle. If no \langle name \rangle is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \langle name \rangle is used. If the \langle index \rangle is out of range, the \langle macro \rangle will be set to 0pt.

\begin{tabular}{ll}
\useboxarray \{1\} & height of box 1: \boxarraygetheight \mylen \mylen \\
\useboxarray \{2\} & height of box 2: \boxarraygetheight \mylen \mylen \\
\end{tabular}

Test height of box 1: 9.89883pt
height of box 2: 0pt

Assigns the depth of the box with the given \langle index \rangle number from the box array \langle name \rangle to a \langle macro \rangle. If no \langle name \rangle is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \langle name \rangle is used. If the \langle index \rangle is out of range, the \langle macro \rangle will be set to 0pt.

\begin{tabular}{ll}
\useboxarray \{1\} & depth of box 1: \boxarraygetdepth \mylen \mylen \\
\useboxarray \{2\} & depth of box 2: \boxarraygetdepth \mylen \mylen \\
\end{tabular}

Test depth of box 1: 3.69884pt
depth of box 2: 0pt
Assigns the total height of the box with the given \langle index\rangle number from the box array \langle name\rangle to a \langle macro\rangle. If no \langle name\rangle is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \langle name\rangle is used. If the \langle index\rangle is out of range, the \langle macro\rangle will be set to \texttt{0pt}.

\begin{tabular}{ll}
\useboxarray{1} & total height of box 1: \boxarraygettotalheight{\mylen}{1} \mylen \\
\useboxarray{2} & total height of box 2: \boxarraygettotalheight{\mylen}{2} \mylen
\end{tabular}

\begin{verbatim}
\boxarrayreset
\tcbox[size=small,colframe=blue!20,colback=yellow!5,on line, store to box array]{Test}
\begin{tabular}{ll}
\useboxarray{1} & total height of box 1: \boxarraygettotalheight{\mylen}{1} \mylen \\
\useboxarray{2} & total height of box 2: \boxarraygettotalheight{\mylen}{2} \mylen
\end{tabular}
\end{verbatim}

Test

\begin{tabular}{ll}
\useboxarray{1} & total height of box 1: 13.59767pt \\
\useboxarray{2} & total height of box 2: 0pt
\end{tabular}
20.5 Leaflet Example

The following full application example can be used to create leaflets. Obviously, the code can be adapted and customized in many ways.

\documentclass[a4paper,landscape]{article}
\usepackage[noheadfoot,margin=0pt]{geometry}
\usepackage{tcolorbox}
\usepackage{lipsum}

\newenvironment{leaflet}[]{\begin{tcolorbox}[nobeforeafter,empty,colback=white, sharp corners,size=minimal,left=10mm,right=10mm,top=10mm,bottom=10mm, width=\textwidth/3, breakable, break at=\textheight, height fixed for=all, reset box array, store to box array,}{\end{tcolorbox}}

\begin{document}
\begin{leaflet}[underlay={\node[above=5mm,font=\footnotesize] at (frame.south) {- \arabic{tcbbreakpart} -};}]
\includegraphics[width=\linewidth]{Basilica_5.png}
\begin{center}
\textbf{Example}
\end{center}

\section{Introduction}
\lipsum[1]

\section{Main Part A}
\lipsum[2-8]

\section{Main Part B}
\lipsum[9-15]

\section{Conclusion}
\lipsum[16-18]
\end{leaflet}
\end{document}

3 Conclusion


2 Main Part A


1 Introduction

Lorem ipsum dolor et at, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipisci venenatis ipsum. Curabitur id gravida massa ac nunc. 4 Conclusion

Nulla mollis auctor porttitor diam. Donec felis erat, convallis a, convallis tristique, at turpis volutpat. In vitae orci sit amet eleifend egestas, pede pede pretium lorem, quis rutrum. 3 Main Part B

Nec ultrices auctor, pede donecus est vel. Convalis auctor porttitor diam. Donec felis erat, convallis a, convallis tristique, at turpis volutpat. In vitae orci sit amet eleifend egestas, pede pede pretium lorem, quis rutrum.

Nec ultrices auctor, pede donecus est vel. Convalis auctor porttitor diam. Donec felis erat, convallis a, convallis tristique, at turpis volutpat. In vitae orci sit amet eleifend egestas, pede pede pretium lorem, quis rutrum.
The main purpose of this library is to support creation of single page posters with \texttt{tcolorbox}es. A \texttt{tcbposter}\textsuperscript{P.426} is a \texttt{tikzpicture} where \texttt{tcolorbox}es can be placed in a column oriented manner using \texttt{\posterbox}\textsuperscript{P.431} commands. This base concept is more or less copied from the great \texttt{baposter} package.

The \texttt{raster} library, see Section 16 on page 298, can produce similar looking results and may be more appropriate depending on the actual project.

- The \texttt{raster} library has a flow oriented concept, just like a conventional text flow. The text flow (box flow) is a merely endless ribbon which gets broken into lines (and paragraphs) and the lines are broken into pages. \texttt{raster} shapes the boxes to convenient sizes to fill lines and pages in a pleasant way.

- The \texttt{tcbposter} library supports a quite free placement of boxes inside a page. Basically, boxes are placed like \texttt{nodes} are placed inside a \texttt{tikzpicture}. In contrast to \texttt{raster}, this is a single page and not a flow of pages. The poster is divided into columns and rows. There is a more or less gentle force to use the columns (or spans of columns) for positioning and sizing while the row placement is completely optional.

The creation of this library was motivated by Ignasi.

Inside a \texttt{tikzpicture} there should be no embedded \texttt{tikzpictures}. This rule is violated by the \texttt{poster} library. Be aware that there may be some unwanted interactions between the main \texttt{tikzpicture} and the embedded ones inside the \texttt{tcolorbox}es.

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{poster}
\end{verbatim}

This also loads the libraries \texttt{skins}, see Section 10 on page 156, \texttt{breakable}, see Section 19 on page 388, \texttt{magazine}, see Section 20 on page 415, and \texttt{fitting}, see Section 22 on page 439.

### 21.1 Overview

You get the best overview of the \texttt{poster} library and its facilities, if you look at the \texttt{Poster Tutorial} which is part of the \texttt{tcolorbox} documentation:

\texttt{tcolorbox-tutorial-poster.pdf}
21.2 Main Poster Environment

This creates a `tikzpicture` environment with suitable additional settings defined by the given \textit{(options)}. Basically, `\posterbox` and `\posterboxenv` are used to place \texttt{tcolorboxes} as nodes into the environment, but additional \LaTeX{} code can also be used. As \textit{(options)} all \texttt{/tcb/posterset/} keys may be applied, namely:

- \texttt{/tcb/posterset/poster} \textsuperscript{P.428}: poster settings like columns, rows, sizes...
- \texttt{/tcb/posterset/coverage} \textsuperscript{P.429} and \texttt{/tcb/posterset/no coverage} \textsuperscript{P.429}: settings for a surrounding \texttt{tcolorbox} for background and margins.
- \texttt{/tcb/posterset/boxes} \textsuperscript{P.430}: style of the \texttt{tcolorboxes} used for the poster.
- \texttt{/tcb/posterset/fontsize} \textsuperscript{P.430}: scaling of used fonts.

\begin{tcbposter}[
poster = \{showframe,height=10cm,spacing=2mm\},
boxes = \{beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50\},
]
\posterbox\{name=A,column=3,row=2\}{My first box}
\posterbox[adjusted title=Second box]
\{name=B,column=2,span=2,below=A\}{My second box}
\posterbox[adjusted title=Third box]
\{name=C,column=2,between=B and bottom\}{My third box}
\end{tcbposter}
Inside \texttt{tcbposter} \textsuperscript{P.426}, there are several predefined Ti\textsc{k}Z nodes. These nodes share a common \texttt{/tcb/poster/prefix} \textsuperscript{P.428} which is \texttt{TCBPOSTER@} by default. This prefix is used to discriminate the poster nodes from local nodes of any embedded \texttt{tikzpicture} environment. You will never need this prefix using \texttt{\posterbox} \textsuperscript{P.431} and its placement options, but if you want to refer to a predefined node using pure Ti\textsc{k}Z code. The predefined nodes (shown without prefix) are:

- \texttt{poster}: defines the bounding box of the poster (without the coverage).
- \texttt{top}: top position plus row spacing
- \texttt{bottom}: bottom position minus row spacing
- \texttt{middle}: vertical middle position
- \texttt{col1}, \texttt{col2}, \ldots: bounding box of column 1, column 2, \ldots
- \texttt{row1}, \texttt{row2}, \ldots: bounding box of row 1, row 2, \ldots

Further nodes are defined using the \texttt{/tcb/posterloc/name} \textsuperscript{P.432} option.

\begin{itemize}
\item Never use a \texttt{tcbposter} \textsuperscript{P.426} inside a \texttt{tcbposter} \textsuperscript{P.426}. But, if you do anyway, use a different \texttt{/tcb/poster/prefix} \textsuperscript{P.428} for the embedded poster or you surely get a total mess.
\end{itemize}

There are several properties inside a \texttt{tcbposter} \textsuperscript{P.426} which may be useful for advanced code (skip the following on first reading):

- \texttt{\tcbposterwidth}: Width of the poster (without margins).
- \texttt{\tcbposterheight}: Height of the poster (without margins).
- \texttt{\tcbpostercolspacing}: Column distance.
- \texttt{\tcbposterrowspacing}: Row distance.
- \texttt{\tcbpostercolumns}: Column quantity.
- \texttt{\tcbposterrows}: Row quantity.
- \texttt{\tcbpostercolwidth}: Width of a column.
- \texttt{\tcbposterrowheight}: Height of a row.

\begin{verbatim}
\tcbposterset\{\langle options\rangle\}
\end{verbatim}

Sets options for every following \texttt{tcbposter} \textsuperscript{P.426} inside the current \TeX{} group. For example, the numbers for rows and columns may be defined for the whole document by this:

\begin{verbatim}
\tcbposterset\{poster={columns=2,rows=3}\}
\end{verbatim}

See \texttt{tcbposter} \textsuperscript{P.426} for all feasible options.
21.3 Poster Settings

This option can be applied inside \texttt{tcbposter} \footnote{P.426} and \texttt{tcbposterset} \footnote{P.427} to set the given poster \texttt{(option list)}, e.g.

\begin{verbatim}
\tcbposterset{poster={width=20cm,height=15cm}}
\end{verbatim}

For the \texttt{(option list)}, see the following keys.

Sets the \texttt{(number)} of columns for a \texttt{tcbposter}.

\begin{verbatim}
\begin{tcbposter}[
  poster = {showframe,columns=5,rows=2,spacing=1mm,height=4cm},
]
\end{tcbposter}
\end{verbatim}

Sets \texttt{(length)} as distance between columns and rows.

Displays a red auxiliary mesh as optical support during poster creation. Also, every \texttt{/tcb/posterloc/name} \footnote{P.432} is displayed.

\begin{verbatim}
\tcbposterset{coverage={width=\texttt{\linewidth}},}
\end{verbatim}

\texttt{(name)} is set as prefix for any Ti\textit{k}Z node which is generated automatically by the \texttt{poster} library. This encompasses predefined nodes like \texttt{top}, \texttt{bottom}, \ldots, and nodes defined by using \texttt{/tcb/posterloc/name} \footnote{P.432}. Also, see Section 21.2 on page 426. For a typical poster, this value can stay as it is.
21.4 Coverage

\texttt{/tcb/posterset/coverage=\{(option list)\}} \hspace{1cm} \text{(style, no default)}

This option can be applied inside \texttt{tcbposter} \textsuperscript{P.426} and \texttt{\textbackslash tcbposterset} \textsuperscript{P.427} and it adds an optional coverage for the poster which is a surrounding \texttt{tcolorbox} with the given \texttt{(option list)}. Here, margins and background settings for the poster can be given. The \texttt{coverage} has several default \texttt{tcolorbox} settings suitable for the purpose:

\begin{verbatim}
\begin{tcbposter}
poster = \{showframe, spacing=1mm, 
coverage = \{height=5cm, 
    interior style={top color=yellow, bottom color=yellow!50!red},
    watermark text={My Poster}, watermark color=white,
\},
\end{tcbposter}
\end{verbatim}

The \texttt{(option list)} can contain any \texttt{tcolorbox} option.

\begin{verbatim}
\begin{tcbposter}
\begin{verbatim}
poster = \{showframe, spacing=1mm, 
coverage = \{height=5cm, 
    interior style={top color=yellow, bottom color=yellow!50!red},
    watermark text={My Poster}, watermark color=white,
\},
\end{verbatim}
\end{tcbposter}
\end{verbatim}

- For a typical poster, the option \texttt{/tcb/spread} \textsuperscript{P.94} will use the whole page for the poster coverage.
- Poster margins can be adapted by \texttt{/tcb/left} \textsuperscript{P.39}, \texttt{/tcb/right} \textsuperscript{P.40}, \texttt{/tcb/top} \textsuperscript{P.42}, \texttt{/tcb/bottom} \textsuperscript{P.43}.
- Poster background can be changed by \texttt{/tcb/colback} \textsuperscript{P.27}, \texttt{/tcb/interior style} \textsuperscript{P.157}, \texttt{/tcb/interior style image} \textsuperscript{P.158}, etc.
- Do not use \texttt{/tcb/poster/width} \textsuperscript{P.428} and \texttt{/tcb/poster/height} \textsuperscript{P.428} in combination with a \texttt{coverage}. Note that you may use \texttt{/tcb/width} \textsuperscript{P.34} and \texttt{/tcb/height} \textsuperscript{P.53} inside the \texttt{coverage \{(option list)}). Note that this also is not necessary when \texttt{/tcb/spread} \textsuperscript{P.94} is applied.

\texttt{/tcb/posterset/no coverage} \hspace{1cm} \text{(style, no value, initially set)}

Removes the surrounding \texttt{tcolorbox} completely.
21.5 Common Box Settings

This option can be applied inside \texttt{tcbposter} and \texttt{tcbposterset} and it is used to set up the style of the \texttt{tcolorbox}es inside the poster. The \texttt{(option list)} can contain any \texttt{tcolorbox} option, but box size options are not assumed to be useful here, because the size will be determined by the placement options.

\begin{tcbposter}
\begin{tcbitemize}
\item \texttt{poster = \{spacing=2mm,columns=3,rows=2\}}
\item \texttt{coverage = \{height=5cm,}
\begin{tcbitemize}
\item \texttt{interior style = \{top color=yellow,bottom color=yellow!50!red\}}
\end{tcbitemize}
\end{tcbitemize}
\item \texttt{boxes = \{sharp corners=downhill,arc=3mm,boxrule=1mm,}
\begin{tcbitemize}
\item \texttt{colback=white,colframe=cyan,}
\item \texttt{title style = \{left color=black,right color=cyan\}}
\end{tcbitemize}
\item \texttt{fonttitle=\bfseries}
\end{tcbitemize}
\end{tcbposter}

21.6 Font Scaling

This option can be applied inside \texttt{tcbposter} and \texttt{tcbposterset}. It uses \texttt{/tcb/fit basedim} and \texttt{/tcb/fit fontsize macros} to redefine \texttt{\normalsize} and all other standard font size macros like \texttt{\small} and \texttt{\large} accordingly. This needs a freely scalable font family like \texttt{lmodern} to work. If \texttt{/tcb/posterset/fontsize} is not applied, there standard font size macros are not changed in any way.

\begin{tcbposter}
\begin{tcbitemize}
\item \texttt{poster = \{spacing=2mm,columns=3,rows=2\}}
\item \texttt{coverage = \{height=5cm,}
\begin{tcbitemize}
\item \texttt{interior style = \{top color=yellow,bottom color=yellow!50!red\}}
\end{tcbitemize}
\end{tcbitemize}
\item \texttt{boxes = \{sharp corners=downhill,arc=3mm,boxrule=1mm,}
\begin{tcbitemize}
\item \texttt{colback=white,colframe=cyan,}
\item \texttt{title style = \{left color=black,right color=cyan\}}
\end{tcbitemize}
\end{tcbitemize}
\item \texttt{fontsize = 15pt, % \texttt{\normalsize is now 15pt}}
\end{tcbposter}
21.7 Box Placement

$$\texttt{\backslash posterbox}[\langle\text{options}\rangle]\{\langle\text{placement}\rangle\}\{\langle\text{box content}\rangle\}$$

Inside a \texttt{tcbposter} environment, this places a \texttt{tcolorbox} with additional \texttt{tcolorbox} \texttt{\langle\text{options}\rangle} and the given \texttt{\langle\text{box content}\rangle} at a place determined by \texttt{\langle\text{placement}\rangle}. All \texttt{\langle\text{placement}\rangle} options are described in the following. Note that \texttt{\langle\text{box content}\rangle} cannot contain \texttt{verbatim} material, see \texttt{posterboxenv}.

\begin{tcbposter}\[
\begin{array}{c}
\texttt{poster} = \{\texttt{showframe}, \texttt{height}=4\text{cm}, \texttt{spacing}=2\text{mm}, \texttt{rows}=2\}, \\
\texttt{boxes} = \{\texttt{beamer}, \texttt{colframe}=\texttt{blue!50!black}, \texttt{colback}=\texttt{blue!50}, \texttt{colupper}=\texttt{yellow!50}\}, \\
\end{array}
\]
\end{tcbposter}

\begin{posterboxenv}\[
\texttt{title}=\langle\text{My title}\rangle\{\texttt{name}=A, \texttt{column}=2, \texttt{row}=2\}\langle\text{My first box}\rangle
\end{posterboxenv}

This is the environment version of \texttt{\backslash posterbox}, i.e. inside a \texttt{tcbposter} environment, this places a \texttt{tcolorbox} with additional \texttt{tcolorbox} \texttt{\langle\text{options}\rangle} and the given \texttt{\langle\text{environment content}\rangle} at a place determined by \texttt{\langle\text{placement}\rangle}. In contrast to \texttt{\backslash posterbox}, the \texttt{\langle\text{environment content}\rangle} is allowed to contain \texttt{verbatim} material. Note that the implementation of \texttt{\backslash posterbox} is more efficient than the implementation of \texttt{posterboxenv}.

\begin{tcbposter}\[
\begin{array}{c}
\texttt{poster} = \{\texttt{showframe}, \texttt{height}=4\text{cm}, \texttt{spacing}=2\text{mm}, \texttt{rows}=2\}, \\
\texttt{boxes} = \{\texttt{size}=\texttt{small}, \texttt{beamer}, \\
\texttt{colframe}=\texttt{blue!50!black}, \texttt{colback}=\texttt{blue!50}, \texttt{colupper}=\texttt{yellow!50}\}, \\
\end{array}
\]
\begin{posterboxenv}\[
\texttt{title}=\langle\text{My title}\rangle\texttt{name}=A, \texttt{column}=2, \texttt{between}=\texttt{top and bottom}\langle\text{My first box}\rangle
\end{posterboxenv}

\begin{tcblisting}\[
\texttt{size}=\texttt{small}, \texttt{colback}=\texttt{yellow!10}
\end{tcblisting}

\end{tcbposter}
Sets \langle\text{name}\rangle as reference for the current \texttt{posterbox} \textsuperscript{P.431} or \texttt{posterboxenv} \textsuperscript{P.431}. A TikZ shape name is constructed automatically as combination of \texttt{/tcb/poster/prefix} \textsuperscript{P.428} and \langle\text{name}\rangle.

\begin{tcbposter}
\begin{tabular}{|p{1cm}|p{1cm}|p{2cm}|}
\hline
\text{col1} & \text{col2} & \text{col3} \\
\hline
\end{tabular}
\end{tcbposter}

\begin{tcbposter}
\begin{tabular}{|p{1cm}|p{1cm}|p{2cm}|}
\hline
\text{row1} & \text{row2} & \\
\hline
\text{col1} & \text{col2} & \text{col3} \\
\hline
\end{tabular}
\end{tcbposter}

\begin{tcbposter}
\begin{tabular}{|p{1cm}|p{1cm}|p{2cm}|}
\hline
\text{row1} & \text{row2} & \\
\hline
\text{col1} & \text{col2} & \text{col3} \\
\hline
\end{tabular}
\end{tcbposter}

\begin{tcbposter}
\begin{tabular}{|p{1cm}|p{1cm}|p{2cm}|}
\hline
\text{row1} & \text{row2} & \\
\hline
\text{col1} & \text{col2} & \text{col3} \\
\hline
\end{tabular}
\end{tcbposter}

\begin{tcbposter}
\begin{tabular}{|p{1cm}|p{1cm}|p{2cm}|}
\hline
\text{row1} & \text{row2} & \\
\hline
\text{col1} & \text{col2} & \text{col3} \\
\hline
\end{tabular}
\end{tcbposter}
\begin{tcbposter}
poster = {showframe,height=2.5cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}

\begin{tcbposter}
poster = {showframe,height=2.5cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}
The box is placed below another box with the given \( \text{name} \). Also, \( \text{name} \) can be a predefined node, see Section 21.2 on page 426.

\begin{tcbposter}
\[\text{poster} = \{\text{showframe}, \text{height}=3\text{cm}, \text{spacing}=2\text{mm}, \text{rows}=2\},\]
\[\text{boxes} = \{\text{beamer}, \text{colframe}=\text{blue!50!black}, \text{colback}=\text{blue!50}, \text{colupper}=\text{yellow!50}\},\]
\]
\posterbox{\text{name}=A,\text{column}=1,\text{below}=\text{top}}{\text{First box}}
\posterbox{\text{name}=B,\text{column}=1,\text{below}=\text{A}}{\text{Second box}}
\posterbox{\text{name}=C,\text{column}=2,\text{below}=\text{B}}{\text{Third box}}
\posterbox{\text{name}=D,\text{column}=3,\text{below}=\text{row1}}{\text{Fourth box}}
\end{tcbposter}

\begin{tcbposter}
\[\text{poster} = \{\text{showframe}, \text{height}=3\text{cm}, \text{spacing}=2\text{mm}, \text{rows}=2\},\]
\[\text{boxes} = \{\text{beamer}, \text{colframe}=\text{blue!50!black}, \text{colback}=\text{blue!50}, \text{colupper}=\text{yellow!50}\},\]
\]
\posterbox{\text{name}=A,\text{column}=1,\text{above}=\text{bottom}}{\text{First box}}
\posterbox{\text{name}=B,\text{column}=1,\text{above}=\text{A}}{\text{Second box}}
\posterbox{\text{name}=C,\text{column}=2,\text{above}=\text{B}}{\text{Third box}}
\posterbox{\text{name}=D,\text{column}=3,\text{above}=\text{row2}}{\text{Fourth box}}
\end{tcbposter}
The box is placed at the position with the given \langle name \rangle. This is quite likely a predefined node, see Section 21.2 on page 426.

\begin{tcbposter}
\setkeys{tcb}{
poster = {showframe,height=3cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
}
\posterbox{name=A,column=1,at=middle}{First box}
\posterbox{name=B,column=2,at=row1}{Second box}
\end{tcbposter}

The box is placed below a box \langle name1 \rangle and above another box \langle name2 \rangle. Also, \langle name1 \rangle and \langle name2 \rangle can be predefined nodes, see Section 21.2 on page 426.

\begin{tcbposter}
\setkeys{tcb}{
poster = {showframe,height=3cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
}
\posterbox{name=A,column=1,below=top}{First box}
\posterbox{name=B,column=1,between=A and bottom}{Second box}
\posterbox{name=C,column=2,above=bottom}{Third box}
\posterbox{name=D,column=2,between=top and C,span=2}{Fourth box}
\posterbox{name=E,column=3,between=D and bottom}{Fifth box}
\end{tcbposter}
The box is broken into partial boxes. These partial boxes are placed following the given \(\langle \text{sequence} \rangle\) of placements. The feasible syntax for the \(\langle \text{sequence} \rangle\) is:

\[
\langle \text{column a} \rangle \text{ between } \langle \text{name a1} \rangle \text{ and } \langle \text{name a2} \rangle \text{ then } \\
\langle \text{column b} \rangle \text{ between } \langle \text{name b1} \rangle \text{ and } \langle \text{name b2} \rangle \text{ then } \\
\langle \text{column c} \rangle \text{ between } \langle \text{name c1} \rangle \text{ and } \langle \text{name c2} \rangle \text{ then } \
\ldots
\]

Obviously, this places the first part box at \(\langle \text{column a} \rangle\) between \(\langle \text{name a2} \rangle\) and \(\langle \text{name a2} \rangle\). The second box part is placed at \(\langle \text{column b} \rangle\) between \(\langle \text{name b2} \rangle\) and \(\langle \text{name b2} \rangle\), and so on.

\[
\begin{tcbposter}
poster = \{showframe,height=6cm,spacing=2mm,rows=2\}, \\
boxes = \{beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50\}, \\
\end{tcbposter}
\]

\[
\begin{tcbposter}
  \posterbox[adjusted title=A]{name=A,column=1,below=top,span=2}{First box} \\
  \posterbox{name=B,column=2,above=bottom,span=2}{Second box} \\
  \posterbox[adjusted title=C,colframe=red!50!black,colback=red!50]{name=C, sequence=1 between A and bottom then \\
  \quad 2 between A and B then \\
  \quad 3 between top and B}{\lipsum[2]} \\
\end{tcbposter}
\]
If the box content of a /tcb/posterloc/sequence \(\rightarrow\) P.436 is too short to fill all reserved box parts, the empty boxes are drawn with the /tcb/placeholder style. This style can be redefined, e.g. to /tcb/blankest \(\rightarrow\) P.253, if nothing should be drawn for empty boxes.

\begin{tcbposter}
\[ \text{poster} = \{\text{showframe}, \text{height}=2.5\text{cm}, \text{spacing}=2\text{mm}, \text{rows}=2\}, \text{boxes} = \{\text{beamer}, \text{colframe}=\text{blue!50!black}, \text{colback}=\text{blue!50}, \text{colupper}=\text{yellow!50}\}, \] \text{posterbox} \{\text{name}=A, \text{column}=1, \text{below}=\text{top}, \text{span}=2\}\{\text{First box}\} \text{posterbox} \{\text{name}=B, \text{sequence}=1 \text{ between A and bottom then} 2 \text{ between A and bottom then} 3 \text{ between top and bottom} \}\{\text{Second box followed by placeholder boxes}\} \end{tcbposter}

N 2017-07-03 /tcb/placeholder (style, no value)

Horizontal shift of a box by \langle length \rangle.
Vertical shift of a box by \textit{\langle length \rangle}.

\begin{tcbposter}
poster = \{showframe, height=3cm, spacing=2mm, rows=2\},
boxes = \{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50\},
\end{tcbposter}

\begin{tcbposter}
posterbox\{name=A, column=1, row=1, yshift=-4mm\}\{First box\}
posterbox\{name=B, column=2, row=2, yshift=4mm\}\{Second box\}
\end{tcbposter}
The library is loaded by a package option or inside the preamble by:

\tcuselibrary{fitting}

### 22.1 Macros of the Library

\tcboxfit\{(options)\}{\{box content\}}

Creates a colored box where the given \textit{box content} is fitted to the width and height of the box. A \texttt{tcbboxfit} has to have a fixed height. If no fixed height is given, a square box is constructed. In principle, most \textit{(options)} for a \texttt{tcolorbox} \cite{P.12} can be used for \texttt{tcbboxfit} with some restrictions. A \texttt{tcbboxfit} cannot have a lower part and cannot be broken.
See Section 24.6 on page 473 for more elaborate methods to create new commands.

$\texttt{\newtcboxfit[\langle \text{init options} \rangle][\langle \text{name} \rangle][\langle \text{number} \rangle][\langle \text{default} \rangle][\langle \text{options} \rangle]}$

Creates a new macro $\langle \text{name} \rangle$ based on $\texttt{tcboxfit}$, \textsuperscript{P.439}. Basically, $\texttt{\newtcboxfit}$ operates like $\texttt{\newcommand}$. The new macro $\langle \text{name} \rangle$ optionally takes $\langle \text{number} \rangle$+1 arguments, where $\langle \text{default} \rangle$ is the default value for the optional first argument. The $\langle \text{options} \rangle$ are given to the underlying $\texttt{tcboxfit}$. The $\langle \text{init options} \rangle$ allow setting up automatic numbering, see Section 5 from page 114.

\begin{verbatim}
\newtcboxfit{\mybox}{colback=red!5!white, colframe=red!75!black,width=4cm, height=1.5cm,halign=center}
\end{verbatim}

\begin{verbatim}
\mybox{This is my own box.}\par
\mybox{This is my own box with more text to be written.}
\end{verbatim}

\begin{verbatim}
\% \usepackage{lipsum}
\newtcboxfit{\mybox}[2]{colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries, boxsep=1mm,left=0mm,right=0mm,top=0mm, bottom=0mm,halign=center,valign=center, nobeforeafter,width=#1,height=#2}
\mybox[2.5cm]{1cm}{First box}\
\mybox[2.5cm]{1cm}{Second box with more text}\
\mybox[5cm]{2cm}{Third box with text}\
\mybox[5cm]{3cm}{\lipsum[1]}
\end{verbatim}

\begin{verbatim}
\texttt{\renewtcboxfit[\langle \text{init options} \rangle][\langle \text{name} \rangle][\langle \text{number} \rangle][\langle \text{default} \rangle][\langle \text{options} \rangle]}

Operates like $\texttt{\newtcboxfit}$, but based on $\texttt{\renewcommand}$ instead of $\texttt{\newcommand}$. An existing macro is redefined.

\begin{verbatim}
\renewtcboxfit{\langle \text{init options} \rangle}{\langle \text{name} \rangle}{\langle \text{number} \rangle}{\langle \text{default} \rangle}{\langle \text{options} \rangle}
\end{verbatim}
\texttt{\textbackslash tcbfitdim} (read-only \LaTeX\ length)

This is a \LaTeX\ length adapted automatically by most variants of \texttt{/tcb/fit algorithm}\textsuperscript{P.448}. Therefore, it never is to be changed by the user, but may be applied read-only. The \texttt{\textbackslash tcbfitdim} corresponds to the font size and may also be used to calculate box margins or other distances in dependency. The initial and maximum value for \texttt{\textbackslash tcbfitdim} is set by \texttt{/tcb/fit basedim}\textsuperscript{P.443}.

\texttt{\textbackslash tcbfontsize\{\textit{factor}\}}

Selects a font size inside a tcolorbox which is scaled with the given \textit{factor} relative to \texttt{\textbackslash tcbfitdim}. Also see \texttt{/tcb/fit fontsize macros}\textsuperscript{P.444}.

\begin{verbatim}
\tcset{colback=red!5!white, size=small, colframe=red!75!black}
\begin{tcolorbox}[fit basedim=10pt]
  \{tcbfontsize{0.25} Very tiny,\}
  \{tcbfontsize{0.5} Small,\}\}
  \{tcbfontsize{1} Normal,\}\}
  \{tcbfontsize{2} Large,\}\}
  \{tcbfontsize{4} Huge.\}
\end{tcolorbox}
\end{verbatim}

Very tiny, Small, Normal, Large, Huge.

\begin{verbatim}
\tcset{colback=red!5!white, size=small, colframe=red!75!black}
\begin{tcolorbox}[fit basedim=10pt, fit to height=2cm]
  \{tcbfontsize{0.25} Very tiny,\}
  \{tcbfontsize{0.5} Small,\}\}
  \{tcbfontsize{1} Normal,\}\}
  \{tcbfontsize{2} Large,\}\}
  \{tcbfontsize{4} Huge.\}
\end{tcolorbox}
\end{verbatim}

Very tiny, Small, Normal, Large, Huge.
22.2 Option Keys of the Library

The font size for the content of a box with fixed width and fixed height can be adjusted automatically. This is called the *fitbox capture mode*. Note that the fit control algorithm constructs a series of versions for the box and selects the “best”. Therefore, the compilation time is quite longer than for a normal box. The \texttt{fitbox} macro uses this algorithm by default.

![The fit control keys are only applicable to unbreakable boxes without a lower part. The box content should not change counters.]

\noun{tcb/fit} (style, initially unset)

Sets the \texttt{capture} mode to *fitbox*, i.e. enables the font size adjustment algorithm. Thereby, a \texttt{tcolorbox} acts like \texttt{fitbox} where the given \texttt{⟨box content⟩} is fitted to the width and height of the box. Therefore, the box has to have a fixed height. If no fixed height is given, a square box is constructed. The font dimension \texttt{tcbfitdim} can also be used to adjust the margins of the box since a box with a tiny font may not need large margins. The number of constructed boxes is saved to the macro \texttt{tcbfitsteps} for analysis.

\begin{example}
\begin{tcolorbox}[fit,⟨height⟩,⟨valign⟩,⟨opacity⟩,⟨top⟩,⟨bottom⟩,⟨left⟩,⟨right⟩,⟨watermark⟩,⟨col⟩]
\lipsum[⟨number⟩]
\end{tcolorbox}
\end{example
/tcb/fit\text{to}=\langle width\rangle \text{ and } \langle height\rangle \quad \text{(style, initially unset)}

Shortcut for using \texttt{/tcb/fit} \textsuperscript{P.442} and setting the \langle width\rangle and \langle height\rangle values separately.

\begin{tcolorbox}[fit to=3cm and 2cm]
This box content is fitted to the given dimensions.
\end{tcolorbox}

/tcb/fit\text{to height}=\langle height\rangle \quad \text{(style, initially unset)}

Shortcut for using \texttt{/tcb/fit} \textsuperscript{P.442} and setting the \langle height\rangle value separately.

\begin{tcolorbox}[fit to height=2cm]
This box content is fitted to the given height.
\end{tcolorbox}

/tcb/fit\text{basedim}=\langle length\rangle 
(no default, initially 10pt)

Sets the starting font dimension for the font size adjustment algorithm to \langle length\rangle. The algorithm never enlarges this dimension. Therefore, the final \texttt{tcbfitdim} \textsuperscript{P.441} is identical to or smaller than \langle length\rangle.

\begin{tcolorbox}[fit to=4cm and 2cm, fit basedim=50pt]
Enough words for the box.
\end{tcolorbox}

/tcb/fit\text{skip}=\langle real value\rangle 
(no default, initially 1.2)

Sets the skip value of the selected font to \langle real value\rangle times \texttt{tcbfitdim} \textsuperscript{P.441}.

\begin{tcolorbox}[fit to=5cm and 4cm, fit skip=1.0 ]
\lipsum[1]
\end{tcolorbox}
Redefines the standard \LaTeX\ font size macros \texttt{\tiny}, \texttt{\scriptsize}, \texttt{\footnotesize}, \texttt{\small}, \texttt{\normalsize}, \texttt{\large}, \texttt{\Large}, \texttt{\Huge}, and \texttt{\Huge}, to set font sizes relative to the current \texttt{\tcbfitdim}\textsuperscript{\texttt{P.441}}. Note that the display skip values for mathematical formulas are respected by the redefined macros. Also see \texttt{\tcbfontsize}\textsuperscript{\texttt{P.441}}.

\begin{tcolorbox}[fit to height=4cm]
\textbf{This text is not adapted:}
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit to height=4cm, fit fontsize macros]
\textbf{This text is adapted:}
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}
% \usepackage{lipsum}
\tcbset{colback=red!5!white, colframe=red!75!black, left=1mm, right=1mm, boxsep=0mm}
\begin{tcolorbox}[fit to height=4cm]
{\Large\bfseries This text is not adapted:}\par
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit to height=4cm, fit fontsize macros]
{\Large\bfseries This text is adapted:}\par
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}
% \usepackage{lipsum}
\tcbset{colback=red!5!white, colframe=red!75!black, left=1mm, right=1mm, boxsep=0mm}
\let\realHuge=\Huge
\begin{tcolorbox}[fit basedim=7pt, fontupper=\normalsize, fit fontsize macros]
The relative relative font size macros are also usable without the \texttt{\textit{fit}} algorithm.\par
{\realHuge Adapted Huge} --- \{\Huge Original Huge\}
\end{tcolorbox}

\begin{tcolorbox}
\tcbset{colback=red!5!white, colframe=red!75!black, left=1mm, right=1mm, boxsep=0mm}
\let\realHuge=\Huge
\begin{tcolorbox}[fit basedim=7pt, fontupper=\normalsize, fit fontsize macros]
The relative relative font size macros are also usable without the \texttt{\textit{fit}} algorithm.\par
{\realHuge Adapted Huge} --- \{\Huge Original Huge\}
\end{tcolorbox}

\begin{tcolorbox}
% \usepackage{lipsum}
\tcbset{colback=red!5!white, colframe=red!75!black, left=1mm, right=1mm, boxsep=0mm}
\begin{tcolorbox}[height=5cm, fit fontsize macros, fonttitle=\normalsize\bfseries, title=Adapted title]
{\lipsum[2]}
\end{tcolorbox}

% % \usepackage{lipsum}
% \tcbset{colback=red!5!white, colframe=red!75!black, left=1mm, right=1mm, boxsep=0mm}
% \begin{tcolorbox}[fit basedim=7pt, fontupper=\normalsize, fit fontsize macros]
% The relative relative font size macros are also usable without the \texttt{\textit{fit}} algorithm.\par
% {\realHuge Adapted Huge} --- \{\Huge Original Huge\}
% \end{tcolorbox}

% \usepackage{lipsum}
\tcbset{size=fbox, colback=red!5!white, colframe=red!75!black}
\tcbx{fit}[height=5cm, fit fontsize macros, fonttitle=\normalsize\bfseries, title=Adapted title]
{\lipsum[2]}
The box is allowed to enlarge the fixed height up to the given \textit{(dimension)}, before a font size fit is applied. An optional \texttt{/tcb/fit width plus} is tried after the height adaption.

\begin{tcolorbox}[fit]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit,fit height plus=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit,fit height plus=1cm]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit,fit width plus=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit,fit width plus=1cm]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit,fit height plus=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit,fit height plus=1cm]
\lipsum[2]
\end{tcolorbox}
Typically but not necessarily, the optional title of a `tcolorbox` is not part of the fit operation. If a `/tcb/fit width plus` is applied, the title is also adapted to the new width. If counters are increased inside the title text, they may be increased more than one time. To avoid this, you are encouraged to use `/tcb/phantom` or `/tcb/step and label` to set counters or use automatic numbering, see Subsection 5.1 from page 114.

`/tcb/fit width from=⟨min⟩ to ⟨max⟩` (style, no default)

Sets the box width to ⟨min⟩ and allows the width to grow up to ⟨max⟩.

\begin{tcolorbox}[fit,width=\linewidth/2]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit width from=\linewidth/2 to \linewidth]
\lipsum[2]
\end{tcolorbox}
Sets the box height to \( \langle \text{min} \rangle \) and allows the height to grow up to \( \langle \text{max} \rangle \).
Sets the algorithm for the fitting process after optionally width and height are adapted. In the following, adapting the font size means adapting \( \texttt{tcbfitdim} \). Feasible values for \( \langle \text{name} \rangle \) are:

- **\texttt{fontsize}** (initial): The algorithm is a bisection method that adapts the font size until certain stop conditions are fulfilled. This is the most time-consuming method but it is robust and gives pleasant results.

  - The used font has to be freely scalable for this method! Other content than text is not scaled down. The aspect ratio is fully guaranteed.

- **\texttt{fontsize}**: First, the \texttt{fontsize} algorithm is applied. If the font was scaled down and the resulting height is too small, the box is squeezed to fit the area.

  - The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- **\texttt{aresize}**: The algorithm calculates the area size for the text without scaling the font. The text box is shaped for the needed aspect ratio in one or two steps. Finally, it is scaled down with a standard \( \texttt{resizebox} \) macro.

  - The used font has not to be scalable. Every box content is scaled down. The aspect ratio cannot be fully guaranteed.

- **\texttt{aresize}**: The \texttt{aresize} algorithm is applied, but if the content was scaled down and the resulting height is too small, the box is squeezed to fit the area.

  - The used font has not to be scalable. Every box content is scaled down. The aspect ratio cannot be fully guaranteed.

- **\texttt{hybrid}**: First, this algorithm estimates the needed font size in one or two steps. Then an \texttt{aresize} fitting as above is applied.

  - The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- **\texttt{hybrid}**: First, this algorithm estimates the needed font size in one or two steps. Then an \texttt{aresize} fitting as above is applied.

  - The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- **\texttt{squeeze}**: The text box is brutally scaled down to fit.

  - The aspect ratio is very likely to be horrible. You should not use this method for final documents.
Quality \dotfill versus \dotfill Speed

\begin{itemize}
  \item \textbf{fontsize}
    \begin{itemize}
    \end{itemize}
  \item \textbf{hybrid}
    \begin{itemize}
    \end{itemize}
  \item \textbf{areasize}
    \begin{itemize}
    \end{itemize}
  \item \textbf{squeeze}
    \begin{itemize}
    \end{itemize}
\end{itemize}

\begin{itemize}
  \item \textbf{hybrid (possible gap at end)}
    \begin{itemize}
    \end{itemize}
  \item \textbf{hybrid* (no gap but possibly squeezed)}
    \begin{itemize}
    \end{itemize}
\end{itemize}
The following options set control parameters for the fit algorithm. Mainly, they apply to the fontsize variant, see /tcb/fit algorithm P.448. The options should be seen as experimental and are likely to change in future versions, if necessary.

/tcb/fit maxstep=⟨number⟩  (no default, initially 20)
    Sets the maximal step size for the font size adjustment algorithm. In normal situations, the algorithm stops before reaching the initial value of 20 steps. If the box content does not shrink, this value prevents an endless loop.

/tcb/fit maxfontdiff=⟨dimension⟩  (no default, initially 0.1pt)
    The algorithm stops, if the font size is determined within a deviation of ⟨dimension⟩.

/tcb/fit maxfontdiffgap=⟨dimension⟩  (no default, initially 1pt)
    The algorithm stops, if the number of lines is determined and the font size is determined within a deviation of ⟨dimension⟩.

/tcb/fit maxwidthdiff=⟨dimension⟩  (no default, initially 1pt)
    The algorithm stops, if the (optionally) flexible box width is determined within a deviation of ⟨dimension⟩.

/tcb/fit maxwidthdiffgap=⟨dimension⟩  (no default, initially 10pt)
    The algorithm stops, if the number of lines is determined and the (optionally) flexible box width is determined within a deviation of ⟨dimension⟩.

/tcb/fit warning=⟨value⟩  (no default, initially off)
    Typically, the fit control algorithm constructs several auxiliary boxes to determine the optimal one. If not switched off, the construction of the auxiliary boxes may produce many hbox warnings. This option key changes the \hbadness value.
    • off: Most of ‘Underfull \hbox’ and ‘Overfull \hbox’ warnings are switched off (including the ones for the finally used box).
    • on: All warnings for all auxiliary boxes are displayed.
    • final: Only warnings for the finally used box are displayed. Note that an additional box has to be constructed for theses messages.
The library is loaded by a package option or inside the preamble by:
\tcbuselibrary{hooks}

For the skin related options, the library \texttt{skins} has to be loaded separately.

### 23.1 Concept of Hooks

A hook is a placeholder in some \LaTeX{} code where additional code can be added. For example, the \LaTeX{} macro \texttt{\textbackslash AtBeginDocument} adds code to a hook which is placed at the beginning of every document.

Several option keys of \texttt{tcolorbox} allow providing some code which is added to specific places of a colored box. For example, /tcb/before upper \textsuperscript{P.65} places code before the content of the upper part. A following usage of this key overwrites any prior settings.

The library \texttt{hooks} extends /tcb/before upper \textsuperscript{P.65} and several more existing keys to “hookable” versions, e.g. /tcb/before upper app \textsuperscript{P.452} and /tcb/before upper pre \textsuperscript{P.452}. The “hookable” keys don’t overwrite prior settings but either append or prepend the newly given code to the existing code.

The general naming convention (with some small exceptions) is:

- \texttt{(option key) app}: works like \texttt{(option key)} but appends its code to the existing code.
- \texttt{(option key) pre}: works like \texttt{(option key)} but prepends its code to the existing code.

If the original \texttt{(option key)} is used (again), all code will be overwritten. Therefore, the order of the option key usage is crucial.

\begin{verbatim}
% \usepackage{array,tabularx}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X} \% see tabularx
\tcbset{enhanced,fonttitle=\bfseries\large,fontupper=\normalsize\sffamily,\n\color{black},center title,\n\tabularx{\X|Y|Y|Y|Y||Y}{% this sets `before upper` and `after upper`\n\before upper app={Group & One & Two & Three & Four & Sum\\hline&&&&&} }
\begin{tcolorbox}[title=My table] Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00\hline Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00\hline Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00\hline Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00\end{tcolorbox}
\end{verbatim}

<table>
<thead>
<tr>
<th>Group</th>
<th>One</th>
<th>Two</th>
<th>Three</th>
<th>Four</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>1000.00</td>
<td>2000.00</td>
<td>3000.00</td>
<td>4000.00</td>
<td>10000.00</td>
</tr>
<tr>
<td>Green</td>
<td>2000.00</td>
<td>3000.00</td>
<td>4000.00</td>
<td>5000.00</td>
<td>14000.00</td>
</tr>
<tr>
<td>Blue</td>
<td>3000.00</td>
<td>4000.00</td>
<td>5000.00</td>
<td>6000.00</td>
<td>18000.00</td>
</tr>
<tr>
<td>Sum</td>
<td>6000.00</td>
<td>9000.00</td>
<td>12000.00</td>
<td>15000.00</td>
<td>42000.00</td>
</tr>
</tbody>
</table>
23.2 Box Content Additions

The following option keys extend the options given in Subsection 4.11 from page 64.

\( /tcb/before\ \text{title} \text{ app} = \langle \text{code} \rangle \) (no default)

Appends the given \langle \text{code} \rangle to \( /tcb/before\ \text{title} \) after the color and font settings and before the content of the title.

\( /tcb/before\ \text{title} \text{ pre} = \langle \text{code} \rangle \) (no default)

Prepends the given \langle \text{code} \rangle to \( /tcb/before\ \text{title} \) after the color and font settings and before the content of the title.

\( /tcb/after\ \text{title} \text{ app} = \langle \text{code} \rangle \) (no default)

Appends the given \langle \text{code} \rangle to \( /tcb/after\ \text{title} \) after the content of the title.

\( /tcb/after\ \text{title} \text{ pre} = \langle \text{code} \rangle \) (no default)

Prepends the given \langle \text{code} \rangle to \( /tcb/after\ \text{title} \) after the content of the title.

\( /tcb/before\ \text{upper} \text{ app} = \langle \text{code} \rangle \) (no default)

Appends the given \langle \text{code} \rangle to \( /tcb/before\ \text{upper} \) or \( /tcb/before\ \text{upper}\* \) after the color and font settings and before the content of the upper part.

\( /tcb/before\ \text{upper} \text{ pre} = \langle \text{code} \rangle \) (no default)

Prepends the given \langle \text{code} \rangle to \( /tcb/before\ \text{upper} \) or \( /tcb/before\ \text{upper}\* \) after the color and font settings and before the content of the upper part.

\( /tcb/after\ \text{upper} \text{ app} = \langle \text{code} \rangle \) (no default)

Appends the given \langle \text{code} \rangle to \( /tcb/after\ \text{upper} \) or \( /tcb/after\ \text{upper}\* \) after the content of the upper part.

\( /tcb/after\ \text{upper} \text{ pre} = \langle \text{code} \rangle \) (no default)

Prepends the given \langle \text{code} \rangle to \( /tcb/after\ \text{upper} \) or \( /tcb/after\ \text{upper}\* \) after the content of the upper part.

\begin{tcolorbox}
\[
\begin{align*}
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \text{d}x &= \frac{1}{3} x^3 + c.
\end{align*}
\end{tcolorbox}

\( \frac{2}{\sqrt{2}} = \sqrt{2} \) \hspace{1cm} (22)

\( \sum_{n=1}^{\infty} \frac{1}{n} = \infty. \) \hspace{1cm} (23)

\( \int x^2 \text{d}x = \frac{1}{3} x^3 + c. \) \hspace{1cm} (24)

\( \sin \left( \frac{\pi}{2} \right) = 1. \) \hspace{1cm} (25)
The following option keys extend the options given in Subsection 4.14 from page 81.

The “hookable” versions are usable inside the document. In the preamble, they can only be used after explicit setting of \( /tcb/before \rightarrow P.81 \) and \( /tcb/after \rightarrow P.81 \) or by e.g. \( /tcb/parskip \rightarrow P.85 \).

\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title,before app={The box follows:\[4pt\]},
    after app={This is the end.}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

The box follows:

\textbf{My title}

This is a \textbf{tcolorbox}.

This is the end.
23.4 Overlays

The following option keys extend the options given in Subsection 4.12 from page 74.

/tcb/overlay app=⟨graphical code⟩

Appends the given ⟨graphical code⟩ to /tcb/overlay → P.74.

/tcb/overlay pre=⟨graphical code⟩

Prepends the given ⟨graphical code⟩ to /tcb/overlay → P.74.

/tcb/overlay unbroken app=⟨graphical code⟩

Appends the given ⟨graphical code⟩ to /tcb/overlay unbroken → P.75.

/tcb/overlay unbroken pre=⟨graphical code⟩

Prepends the given ⟨graphical code⟩ to /tcb/overlay unbroken → P.75.

/tcb/overlay first app=⟨graphical code⟩

Appends the given ⟨graphical code⟩ to /tcb/overlay first → P.75.

/tcb/overlay first pre=⟨graphical code⟩

Prepends the given ⟨graphical code⟩ to /tcb/overlay first → P.75.
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/tcb/overlay middle app</code></td>
<td>Appends the given <code>graphical code</code> to <code>/tcb/overlay middle</code> → P.75.</td>
</tr>
<tr>
<td><code>/tcb/overlay middle pre</code></td>
<td>Prepends the given <code>graphical code</code> to <code>/tcb/overlay middle</code> → P.75.</td>
</tr>
<tr>
<td><code>/tcb/overlay last app</code></td>
<td>Appends the given <code>graphical code</code> to <code>/tcb/overlay last</code> → P.75.</td>
</tr>
<tr>
<td><code>/tcb/overlay last pre</code></td>
<td>Prepends the given <code>graphical code</code> to <code>/tcb/overlay last</code> → P.75.</td>
</tr>
<tr>
<td><code>/tcb/overlay broken app</code></td>
<td>Appends the given <code>graphical code</code> to <code>/tcb/overlay broken</code> → P.75.</td>
</tr>
<tr>
<td><code>/tcb/overlay broken pre</code></td>
<td>Prepends the given <code>graphical code</code> to <code>/tcb/overlay broken</code> → P.75.</td>
</tr>
<tr>
<td><code>/tcb/overlay unbroken and first app</code></td>
<td>Appends the given <code>graphical code</code> to <code>/tcb/overlay unbroken and first</code> → P.75.</td>
</tr>
<tr>
<td><code>/tcb/overlay unbroken and first pre</code></td>
<td>Prepends the given <code>graphical code</code> to <code>/tcb/overlay unbroken and first</code> → P.75.</td>
</tr>
<tr>
<td><code>/tcb/overlay middle and last app</code></td>
<td>Appends the given <code>graphical code</code> to <code>/tcb/overlay middle and last</code> → P.75.</td>
</tr>
<tr>
<td><code>/tcb/overlay middle and last pre</code></td>
<td>Prepends the given <code>graphical code</code> to <code>/tcb/overlay middle and last</code> → P.75.</td>
</tr>
<tr>
<td><code>/tcb/overlay unbroken and last app</code></td>
<td>Appends the given <code>graphical code</code> to <code>/tcb/overlay unbroken and last</code> → P.75.</td>
</tr>
<tr>
<td><code>/tcb/overlay unbroken and last pre</code></td>
<td>Prepends the given <code>graphical code</code> to <code>/tcb/overlay unbroken and last</code> → P.75.</td>
</tr>
<tr>
<td><code>/tcb/overlay first and middle app</code></td>
<td>Appends the given <code>graphical code</code> to <code>/tcb/overlay first and middle</code> → P.75.</td>
</tr>
<tr>
<td><code>/tcb/overlay first and middle pre</code></td>
<td>Prepends the given <code>graphical code</code> to <code>/tcb/overlay first and middle</code> → P.75.</td>
</tr>
</tbody>
</table>
23.5 Watermarks

The following option keys extend the options given in Subsection 10.3 from page 174.

![Watermarks are special overlays. The hooks library allows the combination of several watermarks and overlays.](image)

/tcb/watermark text app=⟨text⟩

(no default)

Appends a `/tcb/watermark text` \(^{\text{P.174}}\) to the colored box.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,watermark graphics=Basilica_5.png,
  watermark opacity=0.25,
  watermark text app=Basilica,watermark color=Navy]
\lipsum[1-2]
\end{tcolorbox}
```

This example uses a public domain picture from:

[url](http://commons.wikimedia.org/wiki/File:Basilica_5.png)

/tcb/watermark text pre=⟨text⟩

(no default)

Prepends a `/tcb/watermark text` \(^{\text{P.174}}\) to the colored box.

/tcb/watermark text app on=⟨part⟩ is ⟨text⟩

(no default)

Appends a `/tcb/watermark text on` \(^{\text{P.174}}\) the named ⟨part⟩ of a break sequence.

/tcb/watermark text pre on=⟨part⟩ is ⟨text⟩

(no default)

Prepends a `/tcb/watermark text on` \(^{\text{P.174}}\) the named ⟨part⟩ of a break sequence.
Appends a */tcb/watermark graphics* \(\rightarrow \text{P.175}\) referenced by \(\langle \text{file name} \rangle\) to the colored box.

Prepends a */tcb/watermark graphics* \(\rightarrow \text{P.175}\) referenced by \(\langle \text{file name} \rangle\) to the colored box.

Appends a */tcb/watermark graphics on* \(\rightarrow \text{P.175}\) the named \(\langle \text{part} \rangle\) of a break sequence. The picture is referenced by \(\langle \text{file name} \rangle\).

Prepends a */tcb/watermark graphics on* \(\rightarrow \text{P.175}\) the named \(\langle \text{part} \rangle\) of a break sequence. The picture is referenced by \(\langle \text{file name} \rangle\).

Appends a */tcb/watermark tikz* \(\rightarrow \text{P.176}\) with the given tikz \(\langle \text{graphical code} \rangle\) to the colored box.

Prepends a */tcb/watermark tikz* \(\rightarrow \text{P.176}\) with the given tikz \(\langle \text{graphical code} \rangle\) to the colored box.

% \usepackage{tikz}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, watermark color=Navy,watermark opacity=0.25, smiley/.style={watermark tikz pre={% 
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm); \fill[red] (45:5mm) circle (1mm); \fill[red] (135:5mm) circle (1mm); \draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);}}}\begin{tcolorbox}[enhanced,title=My title, watermark text=Watermark, smiley] \lipsum[1-2] \end{tcolorbox}

My title


Appends a */tcb/watermark tikz on* \(\rightarrow \text{P.176}\) the named \(\langle \text{part} \rangle\) of a break sequence.

Prepends a */tcb/watermark tikz on* \(\rightarrow \text{P.176}\) the named \(\langle \text{part} \rangle\) of a break sequence.
23.6 Underlays

The following option keys extend the options given in Section 10.8 on page 204. There are no \texttt{app} type keys since underlays are stackable by default.

\texttt{/tcb/underlay pre=⟨graphical code⟩} (no default)

Prepends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/underlay} \textsuperscript{P.204}.

\texttt{/tcb/underlay unbroken pre=⟨graphical code⟩} (no default)

Prepends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/underlay unbroken} \textsuperscript{P.205}.

\texttt{/tcb/underlay first pre=⟨graphical code⟩} (no default)

Prepends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/underlay first} \textsuperscript{P.205}.

\texttt{/tcb/underlay middle pre=⟨graphical code⟩} (no default)

Prepends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/underlay middle} \textsuperscript{P.205}.

\texttt{/tcb/underlay last pre=⟨graphical code⟩} (no default)

Prepends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/underlay last} \textsuperscript{P.205}.

\texttt{/tcb/underlay boxed title pre=⟨graphical code⟩} (no default)

Prepends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/underlay boxed title} \textsuperscript{P.205}.

\texttt{/tcb/underlay broken pre=⟨graphical code⟩} (no default)

Prepends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/underlay broken} \textsuperscript{P.205}.

\texttt{/tcb/underlay unbroken and first pre=⟨graphical code⟩} (no default)

Prepends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/underlay unbroken and first} \textsuperscript{P.205}.

\texttt{/tcb/underlay middle and last pre=⟨graphical code⟩} (no default)

Prepends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/underlay middle and last} \textsuperscript{P.205}.

\texttt{/tcb/underlay unbroken and last pre=⟨graphical code⟩} (no default)

Prepends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/underlay unbroken and last} \textsuperscript{P.205}.

\texttt{/tcb/underlay first and middle pre=⟨graphical code⟩} (no default)

Prepends the given \texttt{⟨graphical code⟩} to \texttt{/tcb/underlay first and middle} \textsuperscript{P.205}.
23.7 Finishes

The following option keys extend the options given in Section 10.9 on page 206. There are no app type keys since finishes are stackable by default.

\[ /tcb/finish\ \text{pre} = \langle\text{graphical code}\rangle \]  
\[ (\text{no default}) \]

Prepends the given \(\langle\text{graphical code}\rangle\) to \(/tcb/finish\) \(\rightarrow\) P.206.

\[ /tcb/finish\ \text{unbroken\ pre} = \langle\text{graphical code}\rangle \]  
\[ (\text{no default}) \]

Prepends the given \(\langle\text{graphical code}\rangle\) to \(/tcb/finish\ \text{unbroken}\) \(\rightarrow\) P.207.

\[ /tcb/finish\ \text{first\ pre} = \langle\text{graphical code}\rangle \]  
\[ (\text{no default}) \]

Prepends the given \(\langle\text{graphical code}\rangle\) to \(/tcb/finish\ \text{first}\) \(\rightarrow\) P.207.

\[ /tcb/finish\ \text{middle\ pre} = \langle\text{graphical code}\rangle \]  
\[ (\text{no default}) \]

Prepends the given \(\langle\text{graphical code}\rangle\) to \(/tcb/finish\ \text{middle}\) \(\rightarrow\) P.207.

\[ /tcb/finish\ \text{last\ pre} = \langle\text{graphical code}\rangle \]  
\[ (\text{no default}) \]

Prepends the given \(\langle\text{graphical code}\rangle\) to \(/tcb/finish\ \text{last}\) \(\rightarrow\) P.207.

\[ /tcb/finish\ \text{broken\ pre} = \langle\text{graphical code}\rangle \]  
\[ (\text{no default}) \]

Prepends the given \(\langle\text{graphical code}\rangle\) to \(/tcb/finish\ \text{broken}\) \(\rightarrow\) P.207.

\[ /tcb/finish\ \text{unbroken\ and\ first\ pre} = \langle\text{graphical code}\rangle \]  
\[ (\text{no default}) \]

Prepends the given \(\langle\text{graphical code}\rangle\) to \(/tcb/finish\ \text{unbroken\ and\ first}\) \(\rightarrow\) P.207.

\[ /tcb/finish\ \text{middle\ and\ last\ pre} = \langle\text{graphical code}\rangle \]  
\[ (\text{no default}) \]

Prepends the given \(\langle\text{graphical code}\rangle\) to \(/tcb/finish\ \text{middle\ and\ last}\) \(\rightarrow\) P.207.

\[ /tcb/finish\ \text{unbroken\ and\ last\ pre} = \langle\text{graphical code}\rangle \]  
\[ (\text{no default}) \]

Prepends the given \(\langle\text{graphical code}\rangle\) to \(/tcb/finish\ \text{unbroken\ and\ last}\) \(\rightarrow\) P.207.

\[ /tcb/finish\ \text{first\ and\ middle\ pre} = \langle\text{graphical code}\rangle \]  
\[ (\text{no default}) \]

Prepends the given \(\langle\text{graphical code}\rangle\) to \(/tcb/finish\ \text{first\ and\ middle}\) \(\rightarrow\) P.207.

23.8 Skin Code

The following option keys extend the options given in Subsection 9.2 from page 145.

\[ /tcb/frame\ \text{code\ app} = \langle\text{graphical code}\rangle \]  
\[ (\text{no default}) \]

Appends the given \(\langle\text{graphical code}\rangle\) to \(/tcb/frame\ \text{code}\) \(\rightarrow\) P.145.

\[ /tcb/frame\ \text{code\ pre} = \langle\text{graphical code}\rangle \]  
\[ (\text{no default}) \]

Prepends the given \(\langle\text{graphical code}\rangle\) to \(/tcb/frame\ \text{code}\) \(\rightarrow\) P.145.

\[ /tcb/interior\ \text{titled\ code\ app} = \langle\text{graphical code}\rangle \]  
\[ (\text{no default}) \]

Appends the given \(\langle\text{graphical code}\rangle\) to \(/tcb/interior\ \text{titled\ code}\) \(\rightarrow\) P.145.
23.9 Extras

The following option keys extend the options given in Section 19.5 on page 397. There are no app type keys since extras are stackable by default.

\[ \text{/tcb/ extras pre=\{}\langle \text{options}\rangle\\} \quad \text{(no default)} \]

Prepends the given \langle \text{options}\rangle to /tcb/ extras  \textsuperscript{P.397}.

\[ \text{/tcb/ extras unbroken pre=\{}\langle \text{options}\rangle\\} \quad \text{(no default)} \]

Prepends the given \langle \text{options}\rangle to /tcb/ extras unbroken  \textsuperscript{P.397}.

\[ \text{/tcb/ extras first pre=\{}\langle \text{options}\rangle\\} \quad \text{(no default)} \]

Prepends the given \langle \text{options}\rangle to /tcb/ extras first  \textsuperscript{P.397}.

\[ \text{/tcb/ extras middle pre=\{}\langle \text{options}\rangle\\} \quad \text{(no default)} \]

Prepends the given \langle \text{options}\rangle to /tcb/ extras middle  \textsuperscript{P.397}.

\[ \text{/tcb/ extras last pre=\{}\langle \text{options}\rangle\\} \quad \text{(no default)} \]

Prepends the given \langle \text{options}\rangle to /tcb/ extras last  \textsuperscript{P.397}.

\[ \text{/tcb/ extras broken pre=\{}\langle \text{options}\rangle\\} \quad \text{(no default)} \]

Prepends the given \langle \text{options}\rangle to /tcb/ extras broken  \textsuperscript{P.397}.

\[ \text{/tcb/ extras unbroken and first pre=\{}\langle \text{options}\rangle\\} \quad \text{(no default)} \]

Prepends the given \langle \text{options}\rangle to /tcb/ extras unbroken and first  \textsuperscript{P.397}.

\[ \text{/tcb/ extras middle and last pre=\{}\langle \text{options}\rangle\\} \quad \text{(no default)} \]

Prepends the given \langle \text{options}\rangle to /tcb/ extras middle and last  \textsuperscript{P.397}.

\[ \text{/tcb/ extras unbroken and last pre=\{}\langle \text{options}\rangle\\} \quad \text{(no default)} \]

Prepends the given \langle \text{options}\rangle to /tcb/ extras unbroken and last  \textsuperscript{P.397}.

\[ \text{/tcb/ extras first and middle pre=\{}\langle \text{options}\rangle\\} \quad \text{(no default)} \]

Prepends the given \langle \text{options}\rangle to /tcb/ extras first and middle  \textsuperscript{P.398}.

23.10 Listings

The following option keys extend the options given in Section 17 from page 320.

\[ \text{/tcb/ listing options app=\{}\langle \text{options}\rangle\\} \quad \text{(no default)} \]

Appends the given \langle \text{options}\rangle to /tcb/ listing options  \textsuperscript{P.327}.

\[ \text{/tcb/ listing options pre=\{}\langle \text{options}\rangle\\} \quad \text{(no default)} \]

Prepends the given \langle \text{options}\rangle to /tcb/ listing options  \textsuperscript{P.327}.

\[ \text{/tcb/ minted options app=\{}\langle \text{options}\rangle\\} \quad \text{(no default)} \]

Appends the given \langle \text{options}\rangle to /tcb/ minted options  \textsuperscript{P.330}.

\[ \text{/tcb/ minted options pre=\{}\langle \text{options}\rangle\\} \quad \text{(no default)} \]

Prepends the given \langle \text{options}\rangle to /tcb/ minted options  \textsuperscript{P.330}.

461
The library is loaded by a package option or inside the preamble by:

```
\tcbuselibrary{xparse}
```

This also loads the package `xparse` [13].

The purpose of this library is to give comfortable access to the powerful document command production with `xparse` for `tcolorbox`. See the `xparse` package documentation [13] for details about the argument (specification) used in this section.

### 24.1 Option Keys

**/tcb/verbatim** (style, no value)

Sets options for a `verbatim` style `tcb` P.14. Since the indented boxes may contain only very few words, the dimensions are made smaller and `/tcb/nobeforeafter` P.81 and `/tcb/tcbox raise base` P.102 are set.

```
\DeclareTotalTCBox{myverb}{ v }{verbatim,
    colframe=red!75!black,colupper=blue}{#1}
\myverb{\textbf} is a \myverb{\LaTeX} command.
```

**/tcb/IfNoValueTF**=\langle argument \rangle\{\langle true options \rangle\}\{\langle false options \rangle\} (no default)

Wraps the \texttt{\texttt{IfNoValue(TF)}} command(s) of `xparse` for option setting. If the \langle argument \rangle has no value, the \langle true options \rangle are set. Otherwise, the \langle false options \rangle are set.

```
\DeclareTColorBox{mybox}{ o }{colframe=red!75!black,
    IfNoValueTF={#1}{colback=red!5!white}{enhanced,interior style image=#1}}

\begin{mybox}
This is a tcolorbox.
\end{mybox}

\begin{mybox}[goldshade.png]
This is a tcolorbox.
\end{mybox}
```

This is a tcolorbox.
Wraps the \IfValue(TF) command(s) of \texttt{xparse} for option setting. If the \texttt{argument} has a value, the \texttt{true options} are set. Otherwise, the \texttt{false options} are set.

\begin{mybox}
This is a tcolorbox.
\end{mybox}

\begin{mybox}
\texttt{My title}
This is a tcolorbox.
\end{mybox}

\begin{mybox}
\texttt{My title}
This is a tcolorbox.
\end{mybox}

Wraps the \IfBoolean(TF) command(s) of \texttt{xparse} for option setting. If the \texttt{argument} is \texttt{\BooleanTrue}, the \texttt{true options} are set. If the \texttt{argument} is \texttt{\BooleanFalse}, the \texttt{false options} are set.

\begin{mybox}
\texttt{My title}
This is a tcolorbox.
\end{mybox}

\begin{mybox}
This is a tcolorbox.
\end{mybox}

\begin{mybox}
This is a tcolorbox.
\end{mybox}
24.2 Producing \texttt{tcolorbox} Environments and Commands

\begin{verbatim}
\DeclareTColorBox[\(init\ options\)]{\(name\)}{\(specification\)}{\(options\)}
\end{verbatim}

Creates a new environment \(\langle\text{name}\rangle\) based on \texttt{tcolorbox} \textsuperscript{P.12}. Basically, \texttt{\textbackslash DeclareTColorBox} operates like \texttt{\textbackslash DeclareDocumentEnvironment}. This means, the new environment \(\langle\text{name}\rangle\) is constructed with the given argument \(\langle\text{specification}\rangle\). The \(\langle\text{options}\rangle\) are given to the underlying \texttt{tcolorbox} \textsuperscript{P.12}. Note that \texttt{/tcb/savedelimiter} \textsuperscript{P.26} is set to the given \(\langle\text{name}\rangle\) automatically.

The \(\langle\text{init\ options}\rangle\) allow setting up automatic numbering, see Section 5 from page 114. The new environment is always created, irrespective of an already existing environment with the same name.

\begin{verbatim}
\% counter from previous example
\DeclareTColorBox[use counter from=pabox\{mybox\}]{mybox}{ O\{red\} m d"!O{} \}
{enhanced, colframe=#1!75!black, colback=#1!15!white, fonttitle=\bfseries, title={\thetcbcounter~#2}, IfValueT={#3}{watermark text={#3}},#4}

\begin{mybox}{My title}
This is a tcolorbox.
\end{mybox}

\begin{mybox}[blue]{My title}
This is a tcolorbox.
\end{mybox}

\begin{mybox}[green]{My title}"My Watermark"
This is a tcolorbox.
\end{mybox}

\begin{mybox}[yellow]{My title}[colbacktitle=yellow!50!white, coltitle=black]
This is a tcolorbox.
\end{mybox}

\begin{mybox}[purple]{My title}"All together"[coltitle=yellow]
This is a tcolorbox.
\end{mybox}
\end{verbatim}
\NewTColorBox[(init options)]{⟨name⟩}{⟨specification⟩}{⟨options⟩}

Operates like \DeclareTColorBox\textsuperscript{P.464}, but based on \NewDocumentEnvironment instead of \DeclareDocumentEnvironment. An error is issued if ⟨name⟩ has already been defined.

\RenewTColorBox[(init options)]{⟨name⟩}{⟨specification⟩}{⟨options⟩}

Operates like \DeclareTColorBox\textsuperscript{P.464}, but based on \RenewDocumentEnvironment instead of \DeclareDocumentEnvironment. An existing environment is redefined.

\ProvideTColorBox[(init options)]{⟨name⟩}{⟨specification⟩}{⟨options⟩}

Operates like \DeclareTColorBox\textsuperscript{P.464}, but based on \ProvideDocumentEnvironment instead of \DeclareDocumentEnvironment. The environment ⟨name⟩ is only created if it is not already defined.
\DeclareTotalTColorBox\[\langle\text{init options}\rangle]\{\langle\text{name}\rangle\}\{\langle\text{specification}\rangle\}\{\langle\text{options}\rangle\}\{\langle\text{content}\rangle\}

Creates a new command \(\langle\text{name}\rangle\) based on \texttt{tcolorbox} \(\rightarrow\) P.12. In contrast to \DeclareTColorBox \(\rightarrow\) P.464, also the \(\langle\text{content}\rangle\) of the \texttt{tcolorbox} is specified. Basically, \DeclareTotalTColorBox operates like \DeclareDocumentCommand. This means, the new command \(\langle\text{name}\rangle\) is constructed with the given argument \(\langle\text{specification}\rangle\). The \(\langle\text{options}\rangle\) are given to the underlying \texttt{tcolorbox} \(\rightarrow\) P.12 which is filled with the specified \(\langle\text{content}\rangle\).

Note that \texttt{/tcb/savedelimiter} \(\rightarrow\) P.26 is set to the given \(\langle\text{name}\rangle\) automatically. The \(\langle\text{init options}\rangle\) allow setting up automatic numbering, see Section 5 from page 114. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
\DeclareTotalTColorBox\{\diabox\}{ O{\text{\textit{m}}} }
\{ bicolor,nobeforeafter,equal height group=diabox,width=5.7cm, 
fonttitle=\textbf{\textit{tffamily}},adjusted title={#2},center title, 
colframe=blue!20!black,leftupper=0mm,rightupper=0mm,colback=black!75!white,\#1 
\} 
\{ \tikz\path[fill zoom image={#2}] (0,0) rectangle (\linewidth,4cm); \% 
\tcblower \#3 
\}
\end{verbatim}

\begin{verbatim}
\diabox\{blueshade.png\}{Created with \texttt{GIMP}. \url{http://www.gimp.org}}
\diabox\{goldshade.png\}{Created with \texttt{GIMP}. \url{http://www.gimp.org}}
\end{verbatim}

\NewTotalTColorBox\[\langle\text{init options}\rangle]\{\langle\text{name}\rangle\}\{\langle\text{specification}\rangle\}\{\langle\text{options}\rangle\}\{\langle\text{content}\rangle\}

Operates like \DeclareTotalTColorBox, but based on \NewDocumentCommand instead of \DeclareDocumentCommand. An error is issued if \(\langle\text{name}\rangle\) has already been defined.

\RenewTotalTColorBox\[\langle\text{init options}\rangle]\{\langle\text{name}\rangle\}\{\langle\text{specification}\rangle\}\{\langle\text{options}\rangle\}\{\langle\text{content}\rangle\}

Operates like \DeclareTotalTColorBox, but based on \RenewDocumentCommand instead of \DeclareDocumentCommand. An existing command is redefined.

\ProvideTotalTColorBox\[\langle\text{init options}\rangle]\{\langle\text{name}\rangle\}\{\langle\text{specification}\rangle\}\{\langle\text{options}\rangle\}\{\langle\text{content}\rangle\}

Operates like \DeclareTotalTColorBox, but based on \ProvideDocumentCommand instead of \DeclareDocumentCommand. The command \(\langle\text{name}\rangle\) is only created if it is not already defined.
24.3 Producing \texttt{tcbox} Commands

\begin{verbatim}
\DeclareTCBox[\{\langle init options\rangle\}]{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
\end{verbatim}

Creates a new command \langle name\rangle based on \texttt{tcbox} \textsuperscript{P.14}. Basically, \texttt{\DeclareTCBox} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \langle name\rangle is constructed with the given argument \langle specification\rangle. The \langle options\rangle are given to the underlying \texttt{tcbox} \textsuperscript{P.14}.

Note that /tcb/savedelimiter \textsuperscript{P.26} is set to the given \langle name\rangle automatically.

The \langle init options\rangle allow setting up automatic numbering, see Section 5 from page 114. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
% counter from previous example
\DeclareTCBox[use counter from=pabox]{\mybox}{ s m s }{ nobeforeafter, colback=red!5!white, colframe=red!75!black, title={\#2 (Box \the\tcbcounter)}, fonttitle=\bfseries, IfBooleanT={#1}{enhanced, drop shadow}, IfBooleanT={#3}{colbacktitle=red!50!white} }
\mybox{Bird}{This is my first box.}
\hfill\mybox*{Tree}{This is my second box.}
\par\bigskip
\mybox{Bike}*{This is my third box.}
\hfill\mybox*{City}*{This is my fourth box.}
\end{verbatim}

\begin{verbatim}
\NewTCBox[\{}{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
\end{verbatim}

Operates like \texttt{\DeclareTCBox}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \langle name\rangle has already been defined.

\begin{verbatim}
\RenewTCBox[\{}{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
\end{verbatim}

Operates like \texttt{\DeclareTCBox}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.

\begin{verbatim}
\ProvideTCBox[\{}{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
\end{verbatim}

Operates like \texttt{\DeclareTCBox}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \langle name\rangle is only created if it is not already defined.
\DeclareTotalTCBox{(init options)}{(name)}{(specification)}{(options)}{(content)}

Creates a new command \(\text{(name)}\) based on \tcbox\textsuperscript{P.14}. In contrast to \DeclareTCBox\textsuperscript{P.467}, also the \(\text{(content)}\) of the \tcbox\ is specified. Basically, \DeclareTotalTCBox\ operates like \DeclareDocumentCommand. This means, the new command \(\text{(name)}\) is constructed with the given argument \(\text{(specification)}\). The \(\text{(options)}\) are given to the underlying \tcbox\textsuperscript{P.14} which is filled with the specified \(\text{(content)}\).

Note that /tcb/savedelimiter\textsuperscript{P.26} is set to the given \(\text{(name)}\) automatically. The \(\text{(init options)}\) allow setting up automatic numbering, see Section 5 from page 114. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
\DeclareTotalTCBox{\myverb}{ O{red} v !O{} }
{ fontupper=\ttfamily,nobeforeafter,tcbox raise base,arc=0pt,outer arc=0pt,
top=0pt,bottom=0pt,left=0mm,right=0mm,
lefterule=0pt,rightrule=0pt,toprule=0.3mm,bottomrule=0.3mm,boxsep=0.5mm,
colback=#1!10!white,colframe=#1!50!black,#3}{#2}
\end{verbatim}

To set a word \textbf{bold} in \LaTeX, use \myverb{\textbf{bold}}. Alternatively, write \myverb{\bfseries bold}. In \LaTeX\{enhanced,fuzzy halo\}, other font settings are done in the same way, e.g. \myverb{\textit}, \myverb{\itshape} or \myverb{\texttt}, \myverb{\ttfamily}.

The next example uses \lstinline\ from the listings package to typeset the verbatim content.

% \usepackage{listings} or \tcbuselibrary{listings}
\DeclareTotalTCBox{\commandbox}{ s v }
{verbatim,colupper=white,colback=black!75!white,colframe=black}
{IfBooleanT{#1}{\textcolor{red}{\ttfamily\bfseries > }}\%\lstinline[language=command.com,keywordstyle=\color{blue!35!white}\bfseries]{\^#2^}}

\commandbox{cd "My Documents"} changes to directory \commandbox{My Documents}.
\commandbox{dir /A} lists the directory content.
\commandbox{copy example.txt d:\target} copies \commandbox{example.txt} to \commandbox{d:\target}.

- \texttt{cd "My Documents"} changes to directory \texttt{My Documents}.
- \texttt{dir /A} lists the directory content.
- \texttt{copy example.txt d:\target} copies \texttt{example.txt} to \texttt{d:\target}. 468
\texttt{\texttt{NewTotalTCBox}}\{\langle init options\rangle\}\{\langle name\rangle\}\{\langle specification\rangle\}\{\langle options\rangle\}\{\langle content\rangle\}

Operates like \texttt{\texttt{DeclareTotalTCBox}}\textsuperscript{P.468}, but based on \texttt{NewDocumentCommand} instead of \texttt{DeclareDocumentCommand}. An error is issued if \langle name\rangle\ has already been defined.

\texttt{\texttt{RenewTotalTCBox}}\{\langle init options\rangle\}\{\langle name\rangle\}\{\langle specification\rangle\}\{\langle options\rangle\}\{\langle content\rangle\}

Operates like \texttt{\texttt{DeclareTotalTCBox}}\textsuperscript{P.468}, but based on \texttt{RenewDocumentCommand} instead of \texttt{DeclareDocumentCommand}. An existing command is redefined.

\texttt{\texttt{ProvideTotalTCBox}}\{\langle init options\rangle\}\{\langle name\rangle\}\{\langle specification\rangle\}\{\langle options\rangle\}\{\langle content\rangle\}

Operates like \texttt{\texttt{DeclareTotalTCBox}}\textsuperscript{P.468}, but based on \texttt{ProvideDocumentCommand} instead of \texttt{DeclareDocumentCommand}. The command \langle name\rangle\ is only created if it is not already defined.

\texttt{\texttt{tcboxverb}}\{\langle options\rangle\}\{\langle verbatim box content\rangle\}

Creates a colored box based on \texttt{\texttt{tcbox}}\textsuperscript{P.14} which is fitted to the width of the given \langle verbatim box content\rangle\ . The underlying \texttt{\texttt{tcbox}}\textsuperscript{P.14} is styled with /tcb/verbatim\textsuperscript{P.462} plus the given \langle options\rangle\ . The difference to \texttt{\texttt{tcbox}}\textsuperscript{P.14} is that the \langle verbatim box content\rangle\ is interpreted verbatim. Therefore, \texttt{\texttt{tcboxverb}} acts similar to \texttt{\texttt{verb}}.

\texttt{\texttt{tcboxverb}}\{	exttt{\LaTeX}\}, \texttt{\texttt{tcboxverb}}\{colback=blue!10!white,colupper=blue\}\{	exttt{\LaTeX}\},
\texttt{\texttt{tcboxverb}}\{blank,fuzzy halo\}\{	exttt{\LaTeX}\}, \texttt{\texttt{tcboxverb}}\{beamer\}\{	exttt{\LaTeX}\},
\texttt{\texttt{tcboxverb}}\{enhanced,skin=enhancedmiddle jigsaw,colframe=red\}\{	exttt{\LaTeX}\}.

\texttt{\LaTeX}, \texttt{\LaTeX}, \texttt{\LaTeX}
24.4 Producing tcblisting Environments

Besides \texttt{xparsel}e, the following commands also need the \texttt{listings} library to be included.

\begin{quote}
\texttt{\textbackslash DeclareTCBListing}[\langle \text{\textit{init options}} \rangle] \{ \langle \text{\textit{name}} \rangle \}\{ \langle \text{\textit{specification}} \rangle \}\{ \langle \text{\textit{options}} \rangle \}
\end{quote}

Creates a new environment \langle \text{\textit{name}} \rangle based on \texttt{tcblisting} \textsuperscript{P.321}. Basically, \texttt{\textbackslash DeclareTCBListing} operates like \texttt{\textbackslash DeclareDocumentEnvironment}. This means, the new environment \langle \text{\textit{name}} \rangle is constructed with the given argument \langle \text{\textit{specification}} \rangle. The \langle \text{\textit{options}} \rangle are given to the underlying \texttt{tcblisting} \textsuperscript{P.321}. Note that \texttt{/tcb/savedelimiter} \textsuperscript{P.26} is set to the given \langle \text{\textit{name}} \rangle automatically. The \langle \text{\textit{init options}} \rangle allow setting up automatic numbering, see Section 5 from page 114. The new environment is always created, irrespective of an already existing environment with the same name.

\begin{quote}
\begin{Verbatim}
\texttt{\textbackslash DeclareTCBListing} \{ \texttt{mybox} \}\{ \langle s O{} m \rangle \}\{ \%
colback=red!5!white, colframe=red!75!black, fonttitle=\texttt{\textbf{series}},
IfBooleanTF={#1} \{\langle \text{\textit{specification}} \rangle\}
\langle \text{\textit{options}} \rangle \}
\end{Verbatim}
\end{quote}

\begin{quote}
\begin{Verbatim}
\texttt{\textbackslash begin} \{ \texttt{mybox} \}\{ \langle \text{\textit{specification}} \rangle\}
\langle \text{\textit{options}} \rangle \}
\end{Verbatim}
\end{quote}

\begin{quote}
\begin{Verbatim}
\texttt{\textbackslash begin} \{ \texttt{mybox} \}\{ \langle \text{\textit{options}} \rangle\}
\end{Verbatim}
\end{quote}

\begin{quote}
\begin{Verbatim}
\texttt{\textbackslash NewTCBListing}[\langle \text{\textit{init options}} \rangle] \{ \langle \text{\textit{name}} \rangle \}\{ \langle \text{\textit{specification}} \rangle \}\{ \langle \text{\textit{options}} \rangle \}
\end{Verbatim}
\end{quote}

Operates like \texttt{\textbackslash DeclareTCBListing}, but based on \texttt{\textbackslash NewDocumentEnvironment} instead of \texttt{\textbackslash DeclareDocumentEnvironment}. An error is issued if \langle \text{\textit{name}} \rangle has already been defined.

\begin{quote}
\begin{Verbatim}
\texttt{\textbackslash RenewTCBListing}[\langle \text{\textit{init options}} \rangle] \{ \langle \text{\textit{name}} \rangle \}\{ \langle \text{\textit{specification}} \rangle \}\{ \langle \text{\textit{options}} \rangle \}
\end{Verbatim}
\end{quote}

Operates like \texttt{\textbackslash DeclareTCBListing}, but based on \texttt{\textbackslash RenewDocumentEnvironment} instead of \texttt{\textbackslash DeclareDocumentEnvironment}. An existing environment is redefined.

\begin{quote}
\begin{Verbatim}
\texttt{\textbackslash ProvideTCBListing}[\langle \text{\textit{init options}} \rangle] \{ \langle \text{\textit{name}} \rangle \}\{ \langle \text{\textit{specification}} \rangle \}\{ \langle \text{\textit{options}} \rangle \}
\end{Verbatim}
\end{quote}

Operates like \texttt{\textbackslash DeclareTCBListing}, but based on \texttt{\textbackslash ProvideDocumentEnvironment} instead of \texttt{\textbackslash DeclareDocumentEnvironment}. The environment \langle \text{\textit{name}} \rangle is only created if it is not already defined.
With date of 2018-05-12, the \texttt{xparse} \cite{13} package changed the argument collection process. Now, spaces are ignored which leads to a serious change for listing environments ending with an optional argument like \texttt{O{}}. The former behavior of respecting spaces can be preserved by adding a «!». Note that the following code uses \texttt{!O{}} now.

- For older \texttt{xparse} versions, the following code is correct when using \texttt{O{}}.
- For \texttt{xparse} of 2018-05-12, only the first two examples of the following code using \texttt{O{}} are really «good» – all others do not work.
- For \texttt{xparse} of 2018-05-12 and later, the following code is correct when using \texttt{!O{}}.

\begin{tabular}{|l|}
\hline
\textbf{Caveats of using an environment ending with an optional argument} \\
\hline
\end{tabular}

\begin{verbatim}
\DeclareTCLBListing{mybox}{ !O{ }}{listing only,#1}
\begin{mybox}[colframe=red]
\good
\end{mybox}
\begin{mybox}[colframe=red] \good \end{mybox}
\begin{mybox}
\good
\end{mybox}
\begin{mybox} \good\end{mybox}
\begin{mybox} \bad!\end{mybox}
\begin{mybox} \[\good\] \end{mybox}
\begin{mybox} \[\bad!\] \end{mybox}
\end{verbatim}
24.5 Producing \texttt{tcbinputlisting} Commands

The following commands need the \texttt{listings} library to be included.

\begin{verbatim}
\DeclareTCBInputListing[\{\textit{init options}\}]{\{\textit{name}\}}{\{\textit{specification}\}}{\{\textit{options}\}}
\end{verbatim}

Creates a new command \texttt{\{\textit{name}\}} based on \texttt{\texttt{tcbinputlisting}\textsuperscript{\texttt{\textsuperscript{P.323}}}}. Basically, \texttt{\DeclareTCBInputListing} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \texttt{\{\textit{name}\}} is constructed with the given argument \texttt{\{\textit{specification}\}. The \texttt{\{\textit{options}\}} are given to the underlying \texttt{\texttt{tcbinputlisting}}\textsuperscript{\texttt{\textsuperscript{P.323}}}.

The \texttt{\{\textit{init options}\}} allow setting up automatic numbering, see Section 5 from page 114. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
% counter from previous example
\DECLARETCBINPUTLISTING[use counter from=pabox]{mylisting}{O{}O{red}m}{%listing file={\#3},title=Listing~\thetcbcounter, colback=#2!5!white,colframe=#2!50!black,colbacktitle=#2!75!black, fonttitle=\textbf,listing only,#1}

mylisting[before upper=\textit{This is the included file content:}] [blue]{\jobname.tcbtemp}
\end{verbatim}

Listing 24.10

\begin{verbatim}
This is the included file content:
% counter from previous example
\DECLARETCBINPUTLISTING[use counter from=pabox]{mylisting}{O{}O{red}m}{%listing file={\#3},title=Listing~\thetcbcounter, colback=#2!5!white,colframe=#2!50!black,colbacktitle=#2!75!black, fonttitle=\textbf,listing only,#1}

mylisting[before upper=\textit{This is the included file content:}] [blue]{\jobname.tcbtemp}
\end{verbatim}

\begin{verbatim}
\NewTCBInputListing[\{\textit{init options}\}]{\{\textit{name}\}}{\{\textit{specification}\}}{\{\textit{options}\}}
\end{verbatim}

Operates like \texttt{\DeclareTCBInputListing}, but based on \texttt{\texttt{NewDocumentCommand}} instead of \texttt{\texttt{DeclareDocumentCommand}}. An error is issued if \texttt{\{\textit{name}\}} has already been defined.

\begin{verbatim}
\RenewTCBInputListing[\{\textit{init options}\}]{\{\textit{name}\}}{\{\textit{specification}\}}{\{\textit{options}\}}
\end{verbatim}

Operates like \texttt{\DeclareTCBInputListing}, but based on \texttt{\texttt{RenewDocumentCommand}} instead of \texttt{\texttt{DeclareDocumentCommand}}. An existing command is redefined.

\begin{verbatim}
\ProvideTCBInputListing[\{\textit{init options}\}]{\{\textit{name}\}}{\{\textit{specification}\}}{\{\textit{options}\}}
\end{verbatim}

Operates like \texttt{\DeclareTCBInputListing}, but based on \texttt{\texttt{ProvideDocumentCommand}} instead of \texttt{\texttt{DeclareDocumentCommand}}. The command \texttt{\{\textit{name}\}} is only created if it is not already defined.

472
24.6 Producing 

The following commands need the fitting library to be included.

\DeclareTCBoxFit[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}

Creates a new command \langle name \rangle based on \texttt{tcbboxfit}\textsuperscript{\textsuperscript{P.439}}. Basically, \texttt{\DeclareTCBoxFit} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \langle name \rangle is constructed with the given argument \langle specification \rangle. The \langle options \rangle are given to the underlying \texttt{tcbboxfit}\textsuperscript{\textsuperscript{P.439}}.

Note that /tcb/savedelimiter\textsuperscript{\textsuperscript{P.26}} is set to the given \langle name \rangle automatically. The \langle init options \rangle allow setting up automatic numbering, see Section 5 from page 114. The new command is always created, irrespective of an already existing command with the same name.

\NewTCBoxFit[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}

Operates like \texttt{\DeclareTCBoxFit}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \langle name \rangle has already been defined.

\RenewTCBoxFit[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}

Operates like \texttt{\DeclareTCBoxFit}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.

\ProvideTCBoxFit[\langle init options \rangle]{\langle name \rangle}{\langle specification \rangle}{\langle options \rangle}

Operates like \texttt{\DeclareTCBoxFit}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \langle name \rangle is only created if it is not already defined.
\DeclareTotalTCBoxFit[(\textit{init options})]{\langle\textit{name}\rangle}{\langle\textit{specification}\rangle}{\langle\textit{options}\rangle}{\langle\textit{content}\rangle}

Creates a new command \textit{name} based on \texttt{tcboxfit}. In contrast to \texttt{\DeclareTCBoxFit}, also the \textit{content} of the \texttt{tcboxfit} is specified. Basically, \texttt{\DeclareTotalTCBoxFit} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \textit{name} is constructed with the given argument \textit{specification}. The \textit{options} are given to the underlying \texttt{tcboxfit} which is filled with the specified \textit{content}.

Note that /\texttt{tcb/savedelimiter} is set to the given \textit{name} automatically. The \textit{init options} allow setting up automatic numbering, see Section 5 from page 114. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
\% \usepackage{lipsum}
\DeclareTotalTCBoxFit{\multibox}{\{0\} m 0{\{10\} m } {\{\texttt{nobeforeafter},\texttt{colback=red!5!white},\texttt{colframe=red!75!black},\texttt{width=#2},\texttt{height=#2/3*2}, \texttt{valign=center},\#1\} } { \texttt{\foreach \n in \{1,...,\#3\} \{ \#4 \} } }
\multibox[5cm]{I shall not repeat.}
\multibox[colframe=blue!75!white]{5cm}[20]{I shall not repeat.}
\multibox[colback=yellow,height=5cm]{14cm}{100}{I shall not repeat.}
\end{verbatim}

\NewTotalTCBoxFit[(\textit{init options})]{\langle\textit{name}\rangle}{\langle\textit{specification}\rangle}{\langle\textit{options}\rangle}{\langle\textit{content}\rangle}

Operates like \texttt{\ DeclareTotalTCBoxFit}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \textit{name} has already been defined.

\RenewTotalTCBoxFit[(\textit{init options})]{\langle\textit{name}\rangle}{\langle\textit{specification}\rangle}{\langle\textit{options}\rangle}{\langle\textit{content}\rangle}

Operates like \texttt{\DeclareTotalTCBoxFit}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.

\ProvideTotalTCBoxFit[(\textit{init options})]{\langle\textit{name}\rangle}{\langle\textit{specification}\rangle}{\langle\textit{options}\rangle}{\langle\textit{content}\rangle}

Operates like \texttt{\DeclareTotalTCBoxFit}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \textit{name} is only created if it is not already defined.
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{external}

The purpose of this library is to support externalization of document snippets like graphics or boxes which can be compiled stand-alone. These snippets are written to external files, compiled and the resulting pdf files are included to the main document as images. The whole procedure saves compilation time, if such a snippet is costly to compile but needs to compile just once or very seldom.

There are very good alternatives to this library. One should consider the standalone package or the TikZ externalization library instead. The \texttt{external} library is something in between and can be seen as a poor man variant of the TikZ externalization library.

The main differences between TikZ externalization and \texttt{external} are:

- TikZ \texttt{external} compiles the whole original document in a sophisticated way while \texttt{external} uses only the preamble or a part of the preamble of the original document.

- TikZ \texttt{external} can automatically externalize all \texttt{tikzpicture} environments while \texttt{external} externalizes marked snippets only.

- Code snippets to be externalized by \texttt{external} are not restricted to \texttt{tikzpicture} environments. But these snippets have to be stand-alone without dependencies to the rest of the document.

Why should somebody use \texttt{external} instead of the more powerful TikZ \texttt{external}? One reason could be compilation speed, but the main reason for creating the library at all was that TikZ \texttt{external} tends to choke on complicated documents where the sophisticated mechanism stumbles. Since \texttt{external} does not use the original document body for compilation, this cannot happen.

Source snippets are compiled, if their md5 checksum has changed. They are not compiled automatically, if option settings are changed or anything outside the snippet is changed. Use /tcb/external/force remake \textsuperscript{P.476} to force compilation in this case or simply delete the externalized pdf oder md5 files.

To use the externalization options, the compiler has to be called with the \texttt{-shell-escape} permission to authorize potentially dangerous system calls. Be warned that this is a security risk.
25.1 Preparation of a Document for Externalization

The preamble of the main document has to contain the \tcbEXTERNALIZE command. Without this command, no externalization operation will be executed.

It is mandatory for externalization that this command is used once in the preamble of the main document. Every setting before \tcbEXTERNALIZE will also be used for compiling an external snippet. Every setting after \tcbEXTERNALIZE will be ignored for compiling an external snippet. Place this command right before \begin{document}, if you are not absolutely sure about another place.

The main document has to look like the following:

\begin{verbatim}
\documentclass[a4paper]{book}
% for example
\usepackage{...}
% ...
% Typically, all or the very most settings for the document.
\tcbEXTERNALIZE
% Typically, just before \begin{document}
% Additional settings which are ABSOLUTELY irrelevant for the
% stand-alone snippets.
% \begin{document}
% The document.
% This also contains the marked snippets for externalization.
\end{document}
\end{verbatim}

During compilation, a /tcb/external/runner file is dynamically created (several times). This is the actual main file for compiling an externalized snippet.

\begin{verbatim}
\tcbset{external/runner=myrunner.tex}
\end{verbatim}

Sets the \texttt{(file name)} for dynamically created \texttt{runner} file. This is the actual main file for a document snippet. Typically, the initial setting is not needed to be changed.

\begin{verbatim}
\tcbset{external/prefix=ext_}
\end{verbatim}

The \texttt{(text)} is prefixed to any /tcb/external/name→P.478 for an externalization snippet. The initial setting implies saving all snippets into an \texttt{external/} subdirectory. Depending on the operation system, the subdirectory may have to be created manually once.

\begin{verbatim}
\tcbset{external/force remake=true/false}
\end{verbatim}

If set to \texttt{true}, the marked snippets are always compiled. If set to \texttt{false}, the marked snippets are never compiled. The necessity is given, if a compiled pdf file is missing or the md5 checksum of the source snippet has changed.

\begin{verbatim}
\tcbset{external/--}
\end{verbatim}

Shortcut for setting /tcb/external/force remake to \texttt{false}.

\begin{verbatim}
\tcbset{external/!}
\end{verbatim}

Shortcut for setting /tcb/external/force remake to \texttt{true}.
25.2 Marking Externalization Snippets

\begin{tcbexternal}{⟨options⟩}{⟨name⟩}
⟨environment content⟩
\end{tcbexternal}

Marks the environment content as a snippet for externalization. Typically, the content is a \texttt{tikzpicture} or something similar. It is important to note that the snippet should not have any dependencies with the rest of the document, e.g. referencing counters or setting counters is not possible. The ⟨name⟩ is automatically prefixed with /tcb/external/prefix. In combination, this has to be a unique file name. It is advised to not use spaces or umlauts for the name. The ⟨options⟩ are keys from the /tcb/external/ key tree.

\begin{tcbexternal}{example_tikzpicture}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
\end{tcbexternal}

If a \texttt{tcolorbox} is externalized, one should use /tcb/nobeforeafter for the box. Indentation and distances to the text before and after have to be given separately outside the \texttt{tcbexternal} environment.

\begin{tcbexternal}[minipage]{example_tcolorbox}
\begin{tcolorbox}[nobeforeafter,enhanced,fonttitle=\bfseries,title=Externalized Box, colframe=red!50!black,drop fuzzy shadow,interior style={fill overzoom image=goldshade.png}]
This complete tcolorbox is externalized. One cannot use numbered boxes here. Note the \texttt{minipage} option which tells the current line width to the external snippet.
\end{tcolorbox}
\end{tcbexternal}

\textbf{Externalized Box}

This complete tcolorbox is externalized. One cannot use numbered boxes here. Note the \texttt{minipage} option which tells the current line width to the external snippet.
\begin{tcolorbox}[nobeforeafter,enhanced,fonttitle=\bfseries,title=Externalized Box,colframe=blue!50!black,interior style={fill overzoom image=blueshade.png}]
\begin{tcbexternal}[minipage]{example_tcolorbox2}
\color{white}
\begin{itemize}
\item The interior of the tcolorbox is externalized.
\item One can use numbered boxes without problems.
\item Note that the text color has to be set for the text manually since it is converted into an image.
\end{itemize}
\end{tcbexternal}
\end{tcolorbox}

\begin{tcbexternal}[minipage]{example_tabularx}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X}
\begin{tabularx}{\linewidth}{|l||Y|Y|Y|Y||Y|}
\hline
Group & One & Two & Three & Four & Sum\
\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00\
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00\
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00\
\hline
Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00\
\hline
\end{tabularx}
\end{tcbexternal}

\textbf{Externalized Box}

The interior of the tcolorbox is externalized. One can use numbered boxes without problems. Note that the text color has to be set for the text manually since it is converted into an image.

\begin{tcbexternal}[minipage]{example_tabularx}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X}
\begin{tabularx}{\linewidth}{|l||Y|Y|Y|Y||Y|}
\hline
Group & One & Two & Three & Four & Sum\
\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00\
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00\
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00\
\hline
Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00\
\hline
\end{tabularx}
\end{tcbexternal}

\texttt{/tcb/external/name=(name)}

(no default, initially \texttt{unnamed})

The \texttt{(name)} is automatically prefixed with \texttt{/tcb/external/prefix} \textsuperscript{P.476}. In combination, this has to be a unique file name for externalization. Typically, this key is not used directly but is set indirectly as mandatory parameter, see \texttt{tcbexternal} \textsuperscript{P.477}.
This is an externalized version of \texttt{tcolorbox}\textsuperscript{P.12} created using \texttt{\textbackslash newtcbexternalizetcolorbox}\textsuperscript{P.484}:

\begin{tcolorbox}[colframe=blue,colback=blue!5,before skip=6pt]
Inner box.
\end{tcolorbox}

\begin{extcolorbox}[minipage]{example_extcolorbox}
[ enhanced,colframe=red!50!black,colback=yellow!10,\newline fonttitle=\textbf,drop fuzzy shadow,\newline title=My external box ]
This box is completely externalized.
\end{extcolorbox}

\begin{tcolorbox}[colframe=blue,colback=blue!5,before skip=6pt]
Inner box.
\end{tcolorbox}
\end{extcolorbox}

\begin{itemize}
  \item \textbf{Never} externalize numbered boxes.
  \item \textbf{Never} externalize boxes which contain references to other things, e.g. using \texttt{\textbackslash ref} or \texttt{\textbackslash cite}.
  \item \textbf{Never} externalize breakable boxes.
\end{itemize}
This is an externalized version of \texttt{tikzpicture} created using \texttt{\textbackslash newtcbexternalize}\texttt{environment}. ⟨\texttt{options}⟩ and ⟨\texttt{name}⟩ are given to the underlying \texttt{tcbexternalize}\texttt{environment}, while ⟨\texttt{tikz options}⟩ are given to \texttt{tikzpicture}.

\begin{center}
\begin{tikzpicture}
\preamble{\usepackage{pgfplots}}, \% add package for external graph
input source on error=false, \% do not load source on error
\end{tikzpicture}
\pgfplotsset{width=12cm}
\begin{axis}[3d box=background, grid=major, xlabel=$x$, ylabel=$y$, zlabel=$z$, view/h=40, mesh/interior colormap name=hot, colormap/blackwhite, z buffer=sort, domain=0:90, y domain=0:60, zmin=0, zmax=2, z post scale=1.2, ]
\addplot3[surf, mesh/interior colormap name=blackwhite, colormap/hot,] (\{\cos(x)\}, \{\sin(x)\}, \{2*\sin(y)\});
\addplot3[surf] (\{2*\cos(x)*\cos(y)\}, \{\sin(z)*\cos(y)\}, \{2*\sin(y)\});
\end{axis}
\end{tikzpicture}
\end{center}
The text content of a `tcblisting` is externalized with the given \texttt{name}. Note that the listing part is not externalized.

\begin{tcblisting}{externalize listing=example_listing,  
bicolor, colback=yellow!10, colframe=yellow!50!black,  
colbacklower=white, center lower}  
\begin{tikzpicture}  
\path[fill=yellow!50!white] (0,0) circle (11mm);  
\path[fill=white] (0,0) circle (9mm);  
\foreach \w/\c in {90/red, 210/green, 330/blue} {\path[shading=ball, ball color=\c] (\w:1cm) circle (7mm);}  
\end{tikzpicture}  
\end{tcblisting}

\begin{dispExample*}{sidebyside, externalize example=example_example}  
\tikz\path[shading=ball, ball color=red] circle (7mm);  
\end{dispExample*}
25.3 Customization

\[\text{/tcb/external/safety}=(\text{length})\] (no default, initially 2mm)

The snippet box is surrounded with a safety border with a thickness of \(\text{(length)}\). This border is automatically trimmed during picture inclusion. The reason for this mechanism is to catch box content which extrudes over the bounding box. For example, shadows of a \texttt{tcolorbox} are painted outside the bounding box and would be lost otherwise.

\[\text{/tcb/external/environment}=(\text{env})\] (no default, initially unset)

Surrounds the exported snippet text with an environment \(\text{(env)}\) without parameters. Note that this option is ignored for \text{/tcb/externalize listing}\(^{P.481}\).

\[\text{/tcb/external/environment with percent}=\text{true}|\text{false} \] (default true, initially true)

If set to true, the \texttt{\begin} and \texttt{\end} code of \text{/tcb/external/environment} is appended with a percent sign. For verbatim environments, this option typically has to be set to false.

\[\text{/tcb/external/minipage}=(\text{length})\] (default \texttt{\linewidth}, initially unset)

Surrounds the exported snippet text with a minipage. The optional \(\text{(length)}\) parameter sets the width of the minipage. Note that the default width is the current line width of the main document. See \text{tcbexternal}\(^{P.477}\) for examples. Note that this option is ignored for \text{/tcb/externalize listing}\(^{P.481}\).

\[\text{/tcb/external/plain}\] (no value, initially set)

Removes any text which was set to surround the snippet. This removes the setting of \text{/tcb/external/minipage}, but is independent of \text{/tcb/external/safety}.

\[\text{/tcb/external/compiler}=(\text{text})\] (no default, initially \texttt{pdflatex})

Sets the name of the compiler for the snippets. Note that this compiler has to support the \texttt{\pdfmdfivesum} primitive e.g. using the \texttt{pdftexcmds} package. This should work for \texttt{xelatex} and \texttt{lualatex}.

\[\text{/tcb/external/runs}=(\text{number})\] (no default, initially 1)

Sets the number of compiler runs for the snippet.

\begin{tcbexternal}[minipage,runs=2]{example_raster}
\begin{tcbitemize}
[raster equal height,
\texttt{\begin{tcbsubitem}[size=small,colframe=red!50!black,colback=red!10!white]}
\texttt{\tcbsubitem One}
\texttt{\tcbsubitem \Huge Two}
\texttt{\tcbsubitem Three}
\texttt{\tcbsubitem Four}
\end{tcbsubitemsize}]
\end{tcbitemize}
\end{tcbexternal}

If set to \texttt{true}, the source code of the snippet is loaded instead of the failed pdf picture. Typically, this will lead to an error stop at the faulty place of the source and such helps detecting the cause. If the source input compiles without error, the document setup may be incorrect, see Section 25.1 on page 476. Maybe, the \texttt{external/} subdirectory has to be created manually in this case, see \text{/tcb/external/prefix}\(^{P.476}\).

If the option is set to \texttt{false}, the compilation stops immediately on an error. The log file of the external snippet has to be consulted for error messages in this case.
The given \texttt{code} is added before the snippet document. Typically, this means before \texttt{\documentclass}. This is not used for compilation of the main document.

The given \texttt{options} are passed to the given \texttt{package} for the snippet document. This is a shortcut for using /tcb/external/preclass with \PassOptionsToPackage. This not used for compilation of the main document.

The given \texttt{options} are passed to the given \texttt{class} for the snippet document. This is a shortcut for using /tcb/external/preclass with \PassOptionsToClass. This not used for compilation of the main document.

Removes all additional /tcb/external/preclass settings.

The given \texttt{code} is added to the preamble of the snippet document. This is not used for compilation of the main document.

The given \texttt{options} are added as parameter for \texttt{\tcbset} to the preamble of the snippet document. This are not used for compilation of the main document.

Removes all additional /tcb/external/preamble settings.

Expands to \texttt{true}, if executed during snippet compilation, and to \texttt{false}, if executed during main document compilation. This can be used before \texttt{\tcbEXTERNALIZE} to give different setting to snippet and main document.

\begin{verbatim}
\tcbifexternal{\{true\}}{\{false\}}
    \usepackage{onlyforexternal}
}\{\usepackage{onlyformain}
\}
\end{verbatim}
\newtcbexternalizeenvironment{⟨newenv⟩}{⟨env⟩}{⟨options⟩}{⟨begin⟩}{⟨end⟩}

Creates a new environment ⟨newenv⟩ which is based on \texttt{tcbexternal} on page 477. This environment takes \textit{at least} one optional parameter and one mandatory parameter. These two parameters are passed to \texttt{tcbexternal} on page 477. Further, the given ⟨options⟩ are always added to the option list of \texttt{tcbexternal} on page 477.

The environment content is externalized and the external snippet is surrounded by an environment ⟨env⟩. All further parameters of ⟨newenv⟩ are given to ⟨env⟩ as parameters. The included image is prepended by ⟨begin⟩ and appended by ⟨end⟩.

\texttt{extikzpicture} on page 480 is an example application for \newtcbexternalizeenvironment.

\begin{extabular}{example_tabular}{|l|p{6cm}|r|}
\hline
A & B & C \\
\hline
a & This table is externalized as snippet. Obviously, this only makes sense for highly complex tables. & b \\
\hline
\end{extabular}

\newtcbexternalizeenvironment{⟨newenv⟩}{⟨env⟩}{⟨options⟩}{⟨begin options⟩}{⟨end⟩}

Identical to \newtcbexternalizeenvironment, but the environment ⟨newenv⟩ is created by \texttt{renenvironment} instead of \texttt{newenvironment}.

\newtcbexternalizetcolorbox{⟨newenv⟩}{⟨env⟩}{⟨options⟩}{⟨begin end options⟩}

Creates a new environment ⟨newenv⟩ which is based on \texttt{tcbexternal} on page 477. This environment takes \textit{at least} one optional parameter and one mandatory parameter. These two parameters are passed to \texttt{tcbexternal} on page 477. Further, the given ⟨options⟩ are always added to the option list of \texttt{tcbexternal} on page 477.

The environment content is externalized and the external snippet is surrounded by an environment ⟨env⟩. All further parameters of ⟨newenv⟩ are given to ⟨env⟩ as parameters. \textbf{In contrast to} \newtcbexternalizeenvironment, \textbf{the environment ⟨env⟩ is intended to be based on} \texttt{tcolorbox} on page 12 or \texttt{tcblisting} on page 321.

The ⟨begin end options⟩ are options for settings the space before and after the included image using \texttt{/tcb/before} on page 81, \texttt{/tcb/before skip} on page 83, \texttt{/tcb/after} on page 81, or \texttt{/tcb/after skip} on page 83.

Use the exact identical values for \texttt{/tcb/before} on page 81 and \texttt{/tcb/after} on page 81 inside ⟨begin end options⟩ as they were used for definition of ⟨env⟩! Otherwise, externalized and non-externalized version will have different spacings.

\texttt{extcolorbox} on page 479 is an example application for \newtcbexternalizetcolorbox.
Definition in the preamble:

\newtcblisting[myownlisting]{2}[
  enhanced,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  colbacktitle=red!50!yellow,before skip=6pt,after skip=6pt,
  title={#2},#1]

\newtcbexternalizetcolorbox{exmyownlisting}{myownlisting}[
  {minipage,environment with percent=false}%
  {before skip=6pt,after skip=6pt}]

\begin{exmyownlisting}{example_mylisting}[
  My externalized example box
  This is my \LaTeX\ box.
\end{exmyownlisting}

\renewtcbexternalizetcolorbox{⟨newenv⟩}{⟨env⟩}{⟨options⟩}{⟨begin end options⟩}

Identical to \newtcbexternalizetcolorbox \textsuperscript{\textcopyright} \textsuperscript{P.484}, but the environment ⟨newenv⟩ is created by \renewenvironment instead of \newenvironment.

\tcbiffileprocess{⟨condition⟩}{⟨source⟩}{⟨md5-file⟩}{⟨target⟩}{⟨true⟩}{⟨false⟩}

This is a low-level macro which is internally used. The MD5 digest of a ⟨source⟩ file is compared with a stored MD5 digest from an auxiliary ⟨md5-file⟩. If they are not equal, the auxiliary ⟨md5-file⟩ is updated to store the current MD5 digest. Further,

- if ⟨condition⟩ equals 0, ⟨true⟩ is executed.
- if ⟨condition⟩ equals 1:
  - If the current and stored MD5 digests were different, ⟨true⟩ is executed.
  - Otherwise, if the ⟨target⟩ file is not existing, ⟨true⟩ is executed.
  - Otherwise, if the ⟨target⟩ file is older than the ⟨md5-file⟩, ⟨true⟩ is executed.
  - Otherwise, ⟨false⟩ is executed.
- if ⟨condition⟩ equals 2, ⟨false⟩ is executed.

The intended processing purpose of the ⟨true⟩ code is to produce a ⟨target⟩ file from the given ⟨source⟩ file.
25.4 Troubleshooting and FAQ

- I use the default settings, but the external subdirectory is not created. Depending on operating system and compiler, an external subdirectory is automatically created or not. If not, create such a directory manually or add the following to your document:\footnote{The \texttt{shellesc} package is loaded automatically by the library.}:

\begin{verbatim}
\ShellEscape{mkdir external}
\end{verbatim}

or

\begin{verbatim}
\ShellEscape{mkdir -p external}
\end{verbatim}

If the combination of \texttt{/tcb/external/prefix}\footnote{P.476} and chosen snippet name points to another subdirectory than external, this has to be adapted.

- I use the \texttt{minted} package and I get a cache directory for every externalized snippet. To avoid this problem, there are several ways.

  - If you do not need \texttt{minted} inside the snippet code, you may use \texttt{\usepackage[minted]} \footnote{P.476} after \texttt{\tcbEXTERNALIZE} or use \texttt{\tcbifexternal} \footnote{P.483} to switch \texttt{minted} off for the external code. If \texttt{minted} is already included by another package, add the following to your preamble:

\begin{verbatim}
\tcbset{external/PassOptionsToPackage={draft}{minted}}
\end{verbatim}

  - If \texttt{minted} is needed for the snippet code, caching can be switched off by adding the following to your preamble:

\begin{verbatim}
\tcbset{external/PassOptionsToPackage={cache=false}{minted}}
\end{verbatim}

Alternatively, the \texttt{cachedir} option of \texttt{minted} may be used to redirect the cache.
This library has the single purpose to support \LaTeX{} package documentations like this one. Actually, the visual nature follows the approach from Till Tantau’s \texttt{pgf} [22] documentation. Typically, this library is assumed to be used in conjunction with the class \texttt{ltxdoc} or alike. Denis Bitouzé, Muzimuzhi, and many others provided very valuable input for this library.

The library is loaded by a package option or inside the preamble by:

\begin{Verbatim}
\tcbuselibrary{documentation}
\end{Verbatim}

This also loads the library \texttt{skins}, see Section 10 on page 156, the library \texttt{raster}, see Section 16 on page 298, the library \texttt{listings}, see Section 17 on page 320, the library \texttt{xparse}, see Section 24 on page 462, and a bunch of packages, namely \texttt{makeidx}, \texttt{marginnote}, \texttt{refcount}, and \texttt{hyperref}. The packages \texttt{pifont} and \texttt{marvosym} should be installed for some symbols, but need not to be loaded.

\begin{itemize}
  \item The package \texttt{makeidx} is loaded only, if \texttt{\printindex} is not already defined. Therefore, one can include an alternative to \texttt{makeidx} like \texttt{imakeidx} before the library \texttt{documentation} is used.
  \item The package \texttt{marginnote} is loaded only, if \texttt{\marginnote} is not already defined.
  \item In contrast to other \texttt{tcolorbox} options, the option settings for \texttt{documentation} are typically not getting reset by \texttt{/tcb/reset}, i.e. they keep their values for embedded boxes.
  \item In combination with DocStrip, \texttt{/tcb/verbatim ignore percent} may be helpful.
\end{itemize}

For UTF-8 support load (ignore this when using Xe\LaTeX{}):

\begin{Verbatim}
\tcbuselibrary{listingsutf8,documentation}
\end{Verbatim}

For \texttt{minted} [12] support, load:

\begin{Verbatim}
\tcbuselibrary{documentation,minted}
\tcbset{listing engine=minted}
\end{Verbatim}

\subsection{Macros of the Library}

\begin{Verbatim}
\begin{docCommand}(⟨options⟩){⟨name⟩}{⟨parameters⟩}
⟨command description⟩
\end{docCommand}
\end{Verbatim}

Documents a \LaTeX{} macro with given \texttt{⟨name⟩} where \texttt{⟨name⟩} is written without backslash. The given \texttt{⟨options⟩} are set with \texttt{/tcbset}. This macro takes mandatory or optional \texttt{⟨parameters⟩}. It is automatically indexed and can be referenced with \texttt{\refCom{⟨name⟩}}.

\hfill \flushright {487}
\begin{docCommand}{foomakedocSubKey}\{\marg{name}\marg{key path}}\end{docCommand}

Creates a new environment \texttt{\textbackslash meta\{name\}} based on \texttt{\textbackslash refEnv\{docKey\}} for the documentation of keys with the given \texttt{\textbackslash meta\{key path\}}.

\begin{docCommand}{foomakedocSubKey}\{\langle name \rangle\}\{\langle key path \rangle\}\end{docCommand}

Creates a new environment \texttt{\langle name \rangle} based on \texttt{docKey}$^\text{P. 491}$ for the documentation of keys with the given \texttt{\langle key path \rangle}.

\begin{docCommand*}\{\marg{name}\marg{key path}}\end{docCommand*}

\begin{docCommand}{foomakedocSubKey*}\{\langle name \rangle\}\{\langle key path \rangle\}\end{docCommand*}

Creates a new environment \texttt{\langle name \rangle} based on \texttt{docKey}$^\text{P. 491}$ for the documentation of keys with the given \texttt{\langle key path \rangle}.

\begin{docCommand*}\{\langle options \rangle\}\{\langle name \rangle\}\{\langle parameters \rangle\}\end{docCommand*}

\begin{docCommand*}\end{docCommand*}

Identical to \texttt{docCommand}$^\text{P. 487}$, but without index entry.

\begin{docCommands}\{\langle options \rangle\}\{\langle variant1 \rangle\},\{\langle variant2 \rangle\},\ldots\}\end{docCommands}

\begin{docCommands}\end{docCommands}

Documents several (similar) \LaTeX{} macro variants simultaneously. The given \texttt{\langle options \rangle} are set with \texttt{\textbackslash tcbset}$^\text{P. 13}$ and are valid for all variants and the documentation text. Every variant is described by an option set (\texttt{\langle variant1 \rangle}, \texttt{\langle variant2 \rangle}, and so on. The most crucial options are /\texttt{tcb/doc name}$^\text{P. 501}$ and /\texttt{tcb/doc parameter}$^\text{P. 501}$.

\begin{docCommands}\{doc no index, \%
\begin{quote}
no index entries for this example
\end{quote}
doc name = newtheorem, \\
doc parameter = \marg{envname}, \\
\} \\
\{ \\
\} \\
\{ doc parameter = \marg{envname}\oarg{numbered within} \}, \\
\{ doc parameter = \oarg{numbered like}\marg{envname} \}, \\
\{ doc name = newtheorem* \}, \\
\} \\
example \\
\end{docCommands}

\newtheorem{\langle envname \rangle} \\
\newtheorem{\langle envname \rangle}{\langle numbered within \rangle} \\
\newtheorem{\langle numbered like \rangle}{\langle envname \rangle} \\
\newtheorem*{\langle envname \rangle}

example
Documents a \LaTeX{} environment with given \langle name\rangle. The given \langle options\rangle are set with \texttt{\textbackslash tcbset} \texttt{\textasciitilde P.13}. This environment takes mandatory or optional \langle parameters\rangle. It is automatically indexed and can be referenced with \texttt{\textbackslash refEnv} \texttt{\textasciitilde P.498} \langle name\rangle.

\begin{docEnvironment}{foocolorbox}\oarg{options}
This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.
\end{docEnvironment}

\begin{foocolorbox}\langle options\rangle
\end{foocolorbox}
This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.

\begin{docEnvironment}\%
[doclang/environment content=My content text]\%
{foocolorbox*}\oarg{options}
This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.
\end{docEnvironment}

\begin{foocolorbox*}\langle options\rangle
\end{foocolorbox*}
This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.

\begin{docEnvironment*}\langle options\rangle\langle name\rangle\langle parameters\rangle
\end{docEnvironment*}
Identical to \texttt{docEnvironment}, but without index entry.
Documents several (similar) \LaTeX environment variants simultaneously. The given \langle options \rangle are set with \texttt{\textbackslash tcbset} \textsuperscript{p.13} and are valid for all variants and the documentation text. Every variant is described by an option set \langle variant1 \rangle, \langle variant2 \rangle, and so on. The most crucial options are \texttt{/tcb/doc name} \textsuperscript{p.501} and \texttt{/tcb/doc parameter} \textsuperscript{p.501}. 

\begin{docEnvironments}
\begin{verbatim}
doc no index, % no index entries for this example
doc parameter = \texttt{\oarg\marg{options}}\marg{title},
doclang/environment content = box content,
\end{verbatim}
\end{docEnvironments}

\begin{verbatim}
doc name = redbox,
doc description = a red colored box,
\}
\{
doc name = greenbox,
doc description = a green colored box,
\}
\{
doc name = bluebox,
doc description = a blue colored box,
\}
\{
doc name = custombox,
doc parameter = \texttt{\oarg\marg{options}}\marg{color}\marg{title},
doc description = a colored box,
\}
\end{verbatim}

\example

\begin{verbatim}
\begin{redbox}\langle options \rangle\langle title \rangle
\end{verbatim}
\begin{verbatim}
\begin{greenbox}\langle options \rangle\langle title \rangle
\end{verbatim}
\begin{verbatim}
\begin{bluebox}\langle options \rangle\langle title \rangle
\end{verbatim}
\begin{verbatim}
\begin{custombox}\langle options \rangle\langle color \rangle\langle title \rangle
\end{verbatim}
\end{verbatim}

\example

490
\begin{docKey}{(key path)}{(options)}{(name)}{(parameters)}{(description)}
\end{docKey}

Documents a key with given \textit{name} and an optional \textit{key path}. The given \textit{options} are set with \texttt{\textbackslash tcbset \textasciitilde P.13}. This key takes mandatory or optional \textit{parameters} as value with a short \textit{description}. It is automatically indexed and can be referenced with \texttt{\textbackslash refKey \textasciitilde P.498\{name\}}.

\begin{verbatim}
\begin{docKey}{foo}{footitle}{\texttt{\textbackslash meta}{text}}{no default, initially empty}
  Creates a heading line with \texttt{\textbackslash meta}{text} as content.
\end{docKey}

% no default, initially empty
/foo/footitle=(text)
\end{verbatim}

\begin{docKey*}
\end{docKey*}

Identical to \texttt{docKey}, but without index entry.

\begin{docKeys}{(options)}{(variant1)}{(variant2)},\ldots\}
\end{docKeys}

Documents several (similar) key variants simultaneously. The given \textit{options} are set with \texttt{\textbackslash tcbset \textasciitilde P.13} and are valid for all variants and the documentation text. Every variant is described by an option set \texttt{(variant1)}, \texttt{(variant2)}, and so on. The most crucial options are \texttt{/tcb/doc keypath \textasciitilde P.501}, \texttt{/tcb/doc name \textasciitilde P.501}, \texttt{/tcb/doc parameter \textasciitilde P.501}, and \texttt{/tcb/doc description \textasciitilde P.502}.

\begin{verbatim}
\begin{docKeys}
  \{ doc no index, % no index entries for this example
  doc keypath = mykeyroot,
  doc parameter = \{=\texttt{\textbackslash meta}{length}\},
  \}
  \{ doc name = width,
  doc description = initially \texttt{10cm},
  \},
  \{ doc name = height,
  doc description = initially \texttt{7cm},
  \},
\}
\end{docKeys}

/mykeyroot/width=(length) \quad \textit{(initially 10cm)}
/mykeyroot/height=(length) \quad \textit{(initially 7cm)}
\end{verbatim}

491
\begin{docPathOperation}[(options)]{⟨name⟩}{⟨parameters⟩}
\end{docPathOperation}

Documents a TikZ path operation with given ⟨name⟩. The given ⟨options⟩ are set with \tcbset→P.13. This TikZ path operation takes mandatory or optional ⟨parameters⟩. It is automatically indexed and can be referenced with \refPathOperation→P.499{⟨name⟩}.

\begin{docPathOperation}{fooop}{\oarg{opt}⟨\meta{name}⟩}{\colOpt{at(⟨\meta{coord}⟩)}}
Imaginary path operation for illustration.
\end{docPathOperation}

\begin{docPathOperation*}[(options)]{⟨name⟩}{⟨parameters⟩}
\end{docPathOperation*}

Identical to \docPathOperation, but without index entry.

\begin{docPathOperations}[(options)]{⟨variant1⟩,⟨variant2⟩,...}
\end{docPathOperations}

Documents several (similar) TikZ path operation variants simultaneously. The given ⟨options⟩ are set with \tcbset→P.13 and are valid for all variants and the documentation text. Every variant is described by an option set ⟨variant1⟩, ⟨variant2⟩, and so on. The most crucial options are /tcb/doc name→P.501 and /tcb/doc parameter→P.501.

\begin{docPathOperations}[
  doc no index, % no index entries for this example
  ]
  {
  doc name = rectangle,
  doc parameter = \meta{corner or cycle},
  },
  {
  doc name = circle,
  doc parameter = \oarg{options},
  },
  {
  doc name = ellipse,
  doc parameter = \oarg{options},
  },
  }
\end{docPathOperations}

\path ... \texttt{rectangle}(corner or cycle) ...;
\path ... \texttt{circle}[⟨options⟩] ...;
\path ... \texttt{ellipse}[⟨options⟩] ...;

example
\docValue{⟨options⟩}{⟨name⟩}
\docValue*{⟨options⟩}{⟨name⟩}
Documents a value with given ⟨name⟩. Typically, this is a value for a key. The given ⟨options⟩ are set with \tcbset→P.13. This value is automatically indexed for \docValue and has no index entry for \docValue*.

A feasible value for \refKey{/foo/footitle} is \docValue*{foovalue}.

\docAuxCommand{⟨options⟩}{⟨name⟩}
\docAuxCommand*{⟨options⟩}{⟨name⟩}
Documents an auxiliary or minor LATEX macro with given ⟨name⟩ where ⟨name⟩ is written without backslash. The given ⟨options⟩ are set with \tcbset→P.13. This macro is automatically indexed indexed for \docAuxCommand and has no index entry for \docAuxCommand*.

The macro \docAuxCommand{fooaux} holds some interesting data.

\docAuxEnvironment{⟨options⟩}{⟨name⟩}
\docAuxEnvironment*{⟨options⟩}{⟨name⟩}
Documents an auxiliary or minor LATEX environment with given ⟨name⟩. The given ⟨options⟩ are set with \tcbset→P.13. This macro is automatically indexed indexed for \docAuxCommand and has no index entry for \docAuxEnvironment*.

The environment \docAuxEnvironment{fooauxenv} holds some interesting data.

\docAuxKey{⟨key path⟩}{⟨options⟩}{⟨name⟩}
\docAuxKey*{⟨key path⟩}{⟨options⟩}{⟨name⟩}
Documents an auxiliary key with given ⟨name⟩ and an optional ⟨key path⟩. The given ⟨options⟩ are set with \tcbset→P.13. It is automatically indexed for \docAuxKey and has no index entry for \docAuxKey*.

The key \docAuxKey{foo}{fooaux} holds some interesting data.

\docCounter{⟨options⟩}{⟨name⟩}
\docCounter*{⟨options⟩}{⟨name⟩}
Documents a counter with given ⟨name⟩. The given ⟨options⟩ are set with \tcbset→P.13. The counter is automatically indexed for \docCounter and has no index entry for \docCounter*.

The counter \docCounter{foocounter} can be used for computation.

\[493\]
\docLength[(options)]{(name)}
\docLength*[[(options)]{(name)}]

Documents a length with given (name). The given (options) are set with \tcbset^P.13. The length is automatically indexed for \docLength and has no index entry for \docLength*.

The length \docLength{foolength} can be used for computation.

The length \foolength can be used for computation.

\docColor[(options)]{(name)}
\docColor*[[(options)]{(name)}]

Documents a color with given (name). The given (options) are set with \tcbset^P.13. The color is automatically indexed for \docColor and has no index entry for \docColor*.

The color \docColor{foocolor} is available.

The color foocolor is available.

\cs{(name)}

Macro from ltxdoc [3] to typeset a command word (name) where the backslash is prefixed. The library overwrites the original macro.

This is a \cs{foocommand}.

This is a \foocommand.

\meta{(text)}

Macro from doc [8] to typeset a meta (text). The library overwrites the original macro.

This is a \meta{text}.

This is a \(text\).

\marg{(text)}

Macro from ltxdoc [3] to typeset a (text) with curly brackets as a mandatory argument. The library overwrites the original macro.

This is a mandatory \marg{argument}.

This is a mandatory \{argument\}.

\oarg{(text)}

Macro from ltxdoc [3] to typeset a (text) with square brackets as an optional argument. The library overwrites the original macro.

This is an optional \oarg{argument}.

This is an optional \[\text{argument}\].
\begin{dispExample}
\textlangle\text{environment content}\trangle
\end{dispExample}

Creates a colored box based on a \textcolorbox\textsuperscript{P.12}. It displays the environment content as source code in the upper part and as compiled text in the lower part of the box. The appearance is controlled by \textcolorbox/documentation listing style\textsuperscript{P.509} and the style \textcolorbox/docexample\textsuperscript{P.509}. It may be changed by redefining this style.

\begin{dispExample}
\textlangle\text{environment content}\trangle
\end{dispExample}

\begin{dispExample*}{sidebyside}
\textlangle\text{environment content}\trangle
\end{dispExample*}

The starred version of \textcolorbox takes \textcolorbox\textsuperscript{P.12} as parameter. These \textcolorbox\textsuperscript{P.509} are executed after \textcolorbox/docexample\textsuperscript{P.509}.

\begin{dispExample*}{sidebyside}
\textlangle\text{environment content}\trangle
\end{dispExample*}

\begin{dispExample}
\textlangle\text{environment content}\trangle
\end{dispExample}

\begin{dispExample*}
\textlangle\text{environment content}\trangle
\end{dispExample*}

This is a \LaTeX\ example.

This is a \LaTeX\ example.

This is a \LaTeX\ example.
\begin{dispListing}
\begin{environment content}
\end{dispListing}

Creates a colored box based on a \texttt{tcolorbox} \textsuperscript{P.12}. It displays the environment content as source code. The appearance is controlled by \texttt{/tcb/documentation listing style} \textsuperscript{P.509} and the style \texttt{/tcb/docexample} \textsuperscript{P.509}. It may be changed by redefining this style.

\begin{dispListing}
This is a \LaTeX\ example.
\end{dispListing}

\begin{dispListing*}{(options)}
\begin{environment content}
\end{dispListing*}

The starred version of \texttt{dispListing} takes \texttt{tcolorbox} \textsuperscript{P.12} \texttt{(options)} as parameter. These \texttt{(options)} are executed after \texttt{/tcb/docexample} \textsuperscript{P.509}.

\begin{dispListing*}{title=My listing}
This is a \LaTeX\ example.
\end{dispListing*}

\begin{absquote}
\begin{environment content}
\end{absquote}

Used to typeset an abstract as quoted and small text.

\begin{absquote}
|tcolorbox| provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part.
\end{absquote}

tcolorbox provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part.
The \texttt{\textbackslash tcbmakedocSubKey} command creates a new environment \langle name \rangle based on \texttt{docKey} \textsuperscript{P.491} for the documentation of keys with the given \langle key path \rangle as root. The new environment \langle name \rangle takes the same parameters as \texttt{docKey} \textsuperscript{P.491} itself. A second starred environment \langle name \rangle is also created, which is identical to \langle name \rangle but without index entry.

\begin{verbatim}
\texttt{\textbackslash tcbmakedocSubKey\{docKey\}\{foo\}}
\begin{docKey}{foodummy}{\langle\text{nothing}\rangle}{\text{no default, initially empty}}
Some key.
\end{docKey}
\begin{docKey*}{foo another dummy}{\langle\text{nothing}\rangle}{\text{no default, initially empty}}
Some key (not indexed).
\end{docKey*}
\end{verbatim}

A key \texttt{/foo/foodummy} has the same description as \texttt{/foo/foo another dummy}, which is (no default, initially empty).

The \texttt{\textbackslash tcbmakedocSubKeys} command creates a new environment \langle name \rangle based on \texttt{docKeys} \textsuperscript{P.491} for the documentation of keys with the given \langle key path \rangle as root. The new environment \langle name \rangle takes the same parameters as \texttt{docKeys} \textsuperscript{P.491} itself.

\begin{verbatim}
\texttt{\textbackslash tcbmakedocSubKeys\{docKeys\}\{foo\}}
\begin{docKeys}
\langle doc parameter = \langle\text{nothing}\rangle, doc description = \text{no default, initially empty} \rangle,
\langle doc name = foodummy 2, \rangle,
\langle doc name = foo another dummy 2, doc no index, \rangle
Some description.
\end{docKeys}
\end{verbatim}

Some description.
\refCom\{\langle \text{name} \rangle \}
References a documented \LaTeX macro with given \langle \text{name} \rangle where \langle \text{name} \rangle is written without backslash. The page reference is suppressed if it links to the same page.

We have created \refCom\{foomakedocSubKey\} as an example.

\refCom*\{\langle \text{name} \rangle \}
References a documented \LaTeX macro with given \langle \text{name} \rangle where \langle \text{name} \rangle is written without backslash. There is no page reference.

We have created \refCom*\{foomakedocSubKey\} as an example.

\refEnv\{\langle \text{name} \rangle \}
References a documented \LaTeX environment with given \langle \text{name} \rangle. The page reference is suppressed if it links to the same page.

We have created \refEnv\{foocolorbox\} as an example.

\refEnv*\{\langle \text{name} \rangle \}
References a documented \LaTeX environment with given \langle \text{name} \rangle. There is no page reference.

We have created \refEnv*\{foocolorbox\} as an example.

\refKey\{\langle \text{name} \rangle \}
References a documented key with given \langle \text{name} \rangle where \langle \text{name} \rangle is the full path name of the key. The page reference is suppressed if it links to the same page.

We have created \refKey\{/foo/footitle\} as an example.

\refKey*\{\langle \text{name} \rangle \}
References a documented key with given \langle \text{name} \rangle where \langle \text{name} \rangle is the full path name of the key. There is no page reference.

We have created \refKey*{/foo/footitle\} as an example.
\refPathOperation\{\langle name \rangle\}

References a documented TikZ path operation with given \langle name \rangle. The page reference is suppressed if it links to the same page.

We have created \refPathOperation{fooop} as an example.

We have created fooop\textsuperscript{P. 492} as an example.

\refPathOperation*\{\langle name \rangle\}

References a documented TikZ path operation with given \langle name \rangle. There is no page reference.

We have created \refPathOperation*{fooop} as an example.

We have created fooop as an example.

\refAux\{\langle name \rangle\}

References some auxiliary environment, key, value, or color. The \langle name \rangle is colored according to /tcb/color hyperlink\textsuperscript{P. 511}, if hyperref colorlinks are set, but there is no real link.

Some pages back, one can see \refAux{/foo/footitle} as an example.

Some pages back, one can see /foo/footitle as an example.

\refAuxcs\{\langle name \rangle\}

References some auxiliary macro \langle name \rangle where \langle name \rangle is written without backslash. The \langle name \rangle is colored according to /tcb/color hyperlink\textsuperscript{P. 511}, if hyperref colorlinks are set, but there is no real link.

Some pages back, one can see \refAuxcs{fooaux} as an example.

Some pages back, one can see \fooaux as an example.

\colDef\{\langle text \rangle\}

Sets \langle text \rangle with the command color, see /tcb/color command\textsuperscript{P. 511}.

This is my \colDef{text}.

This is my text.

\colOpt\{\langle text \rangle\}

Sets \langle text \rangle with the option color, see /tcb/color option\textsuperscript{P. 511}.

This is my \colOpt{text}.

This is my text.
\colFade{\text}

Sets \text{with the fade color, see /tcb/color fade\textsuperscript{P.511}.}

This is my \colFade{text}.

This is my text.

\tcbdocmarginnote{\langle\text\rangle\langle\text\rangle}

Creates a \texttt{tcolorbox} note with the given \text{\langle\text\rangle} inside the margin using the \texttt{marginnote} package. The style of the \texttt{tcolorbox} is predefined and can be altered by \texttt{/tcb/doc marginnote\textsuperscript{P.503}} and the given \text{\langle\text\rangle}.

Some text \tcbdocmarginnote{Note A} which is commented by a note inside the margin. Alternatively to \texttt{\tcbdocmarginnote}, you can always use \texttt{\marginnote} with a \texttt{tcolorbox} directly.\par
This is further text\%
\tcbdocmarginnote{colframe=blue!50!white,colback=blue!5!white}{Note B} with another note.

Some text which is commented by a note inside the margin. Alternatively to \texttt{\tcbdocmarginnote}, you can always use \texttt{\marginnote} with a \texttt{tcolorbox} directly.
This is further text with another note.

\tcbdocnew{\langle\text\rangle}

Auxiliary macro which typesets the \texttt{/tcb/doclang/new\textsuperscript{P.512}} text with the given \text{\langle\text\rangle}. It may be redefined for customization.

\tcbdocnew{1981-10-29}.

\% Next one is displayed in the margin:
\tcbdocmarginnote{\tcbdocnew{1978-02-09}}


\textsuperscript{Note A}

\textsuperscript{Note B}

\tcbdocupdated{\langle\text\rangle}

Auxiliary macro which typesets the \texttt{/tcb/doclang/updated\textsuperscript{P.512}} text with the given \text{\langle\text\rangle}. It may be redefined for customization.

\tcbdocupdated{2014-09-19}.

26.2 Entry Content Option Keys

/tcb/doc name=(name)  (no default, initially empty)
Sets the (name) of the entry to document, i.e. the (name) of the command, environment, key, etc. For docCommand→P.487, docEnvironment→P.489, etc. the (name) is set by a mandatory parameter, but can also be set by /tcb/doc name. /tcb/doc name also sets (name) to /tcb/doc label→P.502, /tcb/doc index→P.502, and /tcb/doc sort index→P.502.

\begin{docCommands}
\begin{verbatim}
doc no index, \% no index entries for this example
doc name = bfseries,
\end{verbatim}
\end{docCommands}
\textbf{\langle text \rangle}
Font setting to bold face.

/tcb/doc parameter=(parameters)  (no default, initially empty)
Sets the (parameters) of the entry to document, i.e. the (parameters) of the command, environment, key, etc. For docCommand→P.487, docEnvironment→P.489, etc. the (parameters) is set by a mandatory option, but can also be set by /tcb/doc parameter.

\begin{docCommands}
\begin{verbatim}
doc no index, \% no index entries for this example
doc name = textbf,
doc parameter = \marg{\text},
\end{verbatim}
\end{docCommands}
\textbf{\langle text \rangle}
Sets \textbf{\langle text \rangle} in bold face.

/tcb/doc keypath=(key path)  (no default, initially empty)
Sets the (key path) of the key to document. For docKey→P.491 and docKey*→P.491 the (key path) is set by a specialized option, but can also be set by /tcb/doc keypath.

\begin{docKeys}
\begin{verbatim}
doc no index, \% no index entries for this example
doc keypath = tikz,
doc name = fill,
doc parameter = \colOpt{\textbf{\langle color \rangle}},
doc description = default is scope's color setting,
\end{verbatim}
\end{docKeys}
/tikz/fill=(\langle color \rangle)  (default is scope's color setting)
This option causes the path to be filled.
Sets a (short!) additional \textit{description} for \texttt{docCommand} \cite{P.487}, \texttt{docEnvironment} \cite{P.489}, or \texttt{docPathOperation} \cite{P.492}. Such a description is mandatory for \texttt{docKey} \cite{P.491}.

\begin{docCommand*}[doc\ description=my\ description]\{my\Command\}{\marg}{\argument} \This\ is\ the\ documentation\ of\ \refCom{my\Command} \which\ takes\ one\ \meta{argument}. \refCom{my\Command} \does\ some\ funny\ things\ with\ its\ \meta{argument}.
\end{docCommand*}

\begin{docPathOperation*}[doc\ label=pathline]\{-\}-\{\meta{coordinate\ or\ cycle}} \This\ is\ the\ documentation\ of\ \refPathOperation{pathline}.
\end{docPathOperation*}

\begin{docCommands}\[doc\ name=\lfbox\example\tl, doc\ sort\ index=\example\tl, \%\ sorted\ unter\ e\ like\ example\]()\end{docCommands}
/tcb/doc into index=true|false

(default true, initially true)

If set to false, no index entries are written for the main documentation environments. The same effect is achieved by using e.g. docCommand* → P.488 instead of docCommand → P.487.

/tcb/doc no index

(style, initially unset)

If set, no index entries are written for the main documentation environments. This is a shortcut for using /tcb/doc into index=false.

/tcb/doc marginnote{/options}

(no default, initially empty)

Sets style /options for the displayed box of the \tcbdocmarginnote → P.500 command.

\tcbset{doc marginnote={colframe=blue!50!white,colback=blue!5!white}}%
This is some text \tcbdocmarginnote{Note A}
which is commented by a note inside the margin.

Note A
This is some text which is commented by a note inside the margin.

/tcb/doc new={date}

(style, no default)

Adds a a marginnote with a “New: {date}” message at the beginning of the upper box part. The intended use is inside the option list of docCommand → P.487, docEnvironment → P.489, etc.

\begin{docCommand}{doc new=2000-01-01}{foosomething}{\marg{text}}
Some command for something.
\end{docCommand}

New: 2000-01-01
\foosomething{⟨text⟩}
Some command for something.

/tcb/doc updated={date}

(style, no default)

Adds a marginnote with a “Updated: {date}” message at the beginning of the upper box part.

/tcb/doc new and updated={⟨new date⟩}{⟨update date⟩}

(style, no default)

Adds a marginnote with “New: ⟨new date⟩” and “Updated: ⟨update date⟩” messages at the beginning of the upper box part. See /tcb/doc new.
26.3 Entry Customization Option Keys

/\texttt{tcb/doc left}=⟨\textit{length}⟩
(no default, initially \texttt{2em})
Sets the left hand offset of the documentation texts from \texttt{docCommand} \textsuperscript{ P.487}, \texttt{docEnvironment} \textsuperscript{ P.489}, \texttt{docKey} \textsuperscript{ P.491}, etc, to \langle length \rangle.

\begin{docCommand*}\[doc left=2cm,doc left indent=-2cm\]{myCommandA}\{\texttt{argument}\}
This is the documentation of \texttt{myCommandA} which takes one \textit{meta}\{argument\}. \texttt{myCommandA} does some funny things with its \textit{meta}\{argument\}.
\end{docCommand*}

\begin{docCommand*}\[doc left indent=2cm\]{myCommandC}\{\texttt{argument}\}
This is the documentation of \texttt{myCommandC} which takes one \textit{meta}\{argument\}. \texttt{myCommandC} does some funny things with its \textit{meta}\{argument\}.
\end{docCommand*}

/\texttt{tcb/doc right}=⟨\textit{length}⟩
(no default, initially \texttt{0em})
Sets the right hand offset of the documentation texts from \texttt{docCommand} \textsuperscript{ P.487}, \texttt{docEnvironment} \textsuperscript{ P.489}, \texttt{docKey} \textsuperscript{ P.491}, etc, to \langle length \rangle.

\begin{docCommand*}\[doc right=2cm\]{myCommandB}\{\texttt{argument}\}
This is the documentation of \texttt{myCommandB} which takes one \textit{meta}\{argument\}. \texttt{myCommandB} does some funny things with its \textit{meta}\{argument\}.
\end{docCommand*}

\begin{docCommand*}\[doc right indent=-10mm,doc right=10mm, doc description=test value\]{myCommandD}\{\texttt{argument}\}
This is the documentation of \texttt{myCommandD} which takes one \textit{meta}\{argument\}. \texttt{myCommandD} does some funny things with its \textit{meta}\{argument\}.
\end{docCommand*}

/\texttt{tcb/doc left indent}=⟨\textit{length}⟩
(no default, initially \texttt{-2em})
Sets the left hand indent of documentation heads from \texttt{docCommand} \textsuperscript{ P.487}, \texttt{docEnvironment} \textsuperscript{ P.489}, \texttt{docKey} \textsuperscript{ P.491}, etc, to \langle length \rangle.

\begin{docCommand*}\[doc left indent=2cm\]{myCommandC}\{\texttt{argument}\}
This is the documentation of \texttt{myCommandC} which takes one \textit{meta}\{argument\}. \texttt{myCommandC} does some funny things with its \textit{meta}\{argument\}.
\end{docCommand*}

/\texttt{tcb/doc right indent}=⟨\textit{length}⟩
(no default, initially \texttt{0pt})
Sets the right hand indent of documentation heads from \texttt{docCommand} \textsuperscript{ P.487}, \texttt{docEnvironment} \textsuperscript{ P.489}, \texttt{docKey} \textsuperscript{ P.491}, etc, to \langle length \rangle.

\begin{docCommand*}\[doc right indent=-10mm,doc right=10mm, doc description=test value\]{myCommandD}\{\texttt{argument}\}
This is the documentation of \texttt{myCommandD} which takes one \textit{meta}\{argument\}. \texttt{myCommandD} does some funny things with its \textit{meta}\{argument\}.
\end{docCommand*}
The head lines of the main documentation environments `docCommand` \textsuperscript{P.487}, `docEnvironment` \textsuperscript{P.489}, `docKey` \textsuperscript{P.491}, etc, are `tcolorboxes` inside a `tcbraster` \textsuperscript{P.300}. Options to the surrounding `tcbrasters` and the embedded `tcolorboxes` can be given using the following keys.

### /tcb/doc raster command\textsuperscript{(options)}

Sets \textit{(options)} for the surrounding `tcbraster` \textsuperscript{P.300} of `docCommand` \textsuperscript{P.487}, `docCommand*` \textsuperscript{P.488}, and `docCommands` \textsuperscript{P.488}.

\begin{verbatim}
\tcbset{doc raster command={raster before skip=7mm,raster after skip=0mm}}
\end{verbatim}

The is an example text.

```
\begin{docCommand*}{myCommandI}{\marg{argument}}
This is the documentation of \texttt{\refCom{myCommandI}} which takes one \texttt{\meta{argument}}. \texttt{\refCom{myCommandI}} does some funny things with its \texttt{\meta{argument}}.
\end{docCommand*}
```

This is the documentation of `\myCommandI` which takes one \texttt{\argument}. `\myCommandI` does some funny things with its \texttt{\argument}.

### /tcb/doc raster environment\textsuperscript{(options)}

Sets \textit{(options)} for the surrounding `tcbraster` \textsuperscript{P.300} of `docEnvironment` \textsuperscript{P.489}, `docEnvironment*` \textsuperscript{P.489}, and `docEnvironments` \textsuperscript{P.490}.

```
\tcbset{doc raster environment={raster before skip=7mm,raster after skip=0mm}}
```

The is an example text.

```
\begin{docEnvironment*}{myCommandI}{\marg{argument}}
This is the documentation of \texttt{\refCom{myCommandI}} which takes one \texttt{\meta{argument}}. \texttt{\refCom{myCommandI}} does some funny things with its \texttt{\meta{argument}}.
\end{docEnvironment*}
```

This is the documentation of `\myCommandI` which takes one \texttt{\argument}. `\myCommandI` does some funny things with its \texttt{\argument}.

### /tcb/doc raster key\textsuperscript{(options)}

Sets \textit{(options)} for the surrounding `tcbraster` \textsuperscript{P.300} of `docKey` \textsuperscript{P.491}, `docKey*` \textsuperscript{P.491}, and `docKeys` \textsuperscript{P.491}.

### /tcb/doc raster path\textsuperscript{(options)}

Sets \textit{(options)} for the surrounding `tcbraster` \textsuperscript{P.300} of `docPathOperation` \textsuperscript{P.492}, `docPathOperation*` \textsuperscript{P.492}, and `docPathOperations` \textsuperscript{P.492}.

### /tcb/doc raster\textsuperscript{(options)}

Shortcut for setting the same \textit{(options)} for `/tcb/doc raster command`, `/tcb/doc raster environment`, `/tcb/doc raster key`, and `/tcb/doc raster path`.

### /tcb/doc head command\textsuperscript{(options)}

Sets \textit{(options)} for the head line of `docCommand` \textsuperscript{P.487}, `docCommand*` \textsuperscript{P.488}, and `docCommands` \textsuperscript{P.488}.

\begin{verbatim}
\tcbset{doc head command={interior style={fill,left color=red!20!white, right color=blue!20!white}}}
\end{verbatim}

```
\begin{docCommand*}{myCommandE}{\marg{argument}}
This is the documentation of \texttt{\refCom{myCommandE}} which takes one \texttt{\meta{argument}}. \texttt{\refCom{myCommandE}} does some funny things with its \texttt{\meta{argument}}.
\end{docCommand*}
```

This is the documentation of `\myCommandE` which takes one \texttt{\argument}. `\myCommandE` does some funny things with its \texttt{\argument}.
/tcb/doc head environment=(options)  (no default, initially empty)
Sets ⟨options⟩ for the head line of docEnvironment \textsuperscript{P.489}, docEnvironment* \textsuperscript{P.489}, and docEnvironments \textsuperscript{P.490}.

\begin{docEnvironment*}{myEnvironment}{⟨argument⟩}
This is the documentation of \refEnv{myEnvironment} which takes one \meta{argument}.
\end{docEnvironment*}

/foo/myKey  (no value)
This is the documentation of /foo/myKey.

/tcb/doc head key=(options)  (no default, initially empty)
Sets ⟨options⟩ for the head line of docKey \textsuperscript{P.491}, docKey* \textsuperscript{P.491}, and docKeys \textsuperscript{P.491}.

\begin{docKey}{/foo/myKey}{}{no value}
This is the documentation of \refKey{/foo/myKey}.
\end{docKey}

/tcb/doc head path=(options)  (no default, initially empty)
Sets ⟨options⟩ for the head line of docPathOperation \textsuperscript{P.492}, docPathOperation* \textsuperscript{P.492}, and docPathOperations \textsuperscript{P.492}.

\begin{docPathOperation*}{-{}-}{⟨coordinate or cycle⟩}
This is the documentation of \refPathOperation{-{}-}.
\end{docPathOperation*}

/tcb/doc head=(options)  (no default, initially empty)
Shortcut for setting the same ⟨options⟩ for /tcb/doc head command \textsuperscript{P.505}, /tcb/doc head environment, /tcb/doc head key, and /tcb/doc head path.
The description texts of the main documentation environments docCommand \(^\text{P.487}\),
docEnvironment \(^\text{P.489}\), docKey \(^\text{P.491}\), etc, are set in a compact form without indentation
and \texttt{parskip=Opt}. This settings can overruled by using the following keys to insert code before
(or after) the description texts.

\begin{docCommand*}{myCommandG}{\marg\{argument\}}
This is the documentation of \refCom{myCommandG} which takes one \meta\{argument\}. \myCommandG does some funny things with its \meta\{argument\}.
\end{docCommand*}

\begin{docCommand*}{myCommandH}{\marg\{argument\}}
This is the documentation of \myCommandG which takes one \{argument\}. \myCommandG does some funny things with its \{argument\}.
\end{docCommand*}

\begin{docEnvironment*}{myEnvironmentG}{\marg\{argument\}}
This is the documentation of \docEnvironmentG which takes one \meta\{argument\}. \docEnvironmentG does some funny things with its \meta\{argument\}.
\end{docEnvironment*}

\begin{docEnvironment*}{myEnvironmentH}{\marg\{argument\}}
This is the documentation of \myEnvironmentG which takes one \{argument\}. \myEnvironmentG does some funny things with its \{argument\}.
\end{docEnvironment*}

\begin{docKey*}{myKeyG}{\marg\{argument\}}
This is the documentation of \docKeyG which takes one \meta\{argument\}. \docKeyG does some funny things with its \meta\{argument\}.
\end{docKey*}

\begin{docKey*}{myKeyH}{\marg\{argument\}}
This is the documentation of \myKeyG which takes one \{argument\}. \myKeyG does some funny things with its \{argument\}.
\end{docKey*}
Executes \langle code \rangle before the description texts of docPathOperation \rightarrow P.492 and docPathOperation* \rightarrow P.492.

Executes \langle code \rangle after the description texts of docPathOperation \rightarrow P.492 and docPathOperation* \rightarrow P.492.

Shortcut for setting the same \langle options \rangle for /tcb/before doc body command \rightarrow P.507, /tcb/before doc body environment \rightarrow P.507, /tcb/before doc body key \rightarrow P.507, and /tcb/before doc body path.

Shortcut for setting the same \langle options \rangle for /tcb/after doc body command \rightarrow P.507, /tcb/after doc body environment \rightarrow P.507, /tcb/after doc body key \rightarrow P.507, and /tcb/after doc body path.
26.4 General Customization Option Keys

/tcb/docexample (style, no value)
Sets the style for \texttt{dispExample} \textsuperscript{P.495} and \texttt{dispListing} \textsuperscript{P.496} with the colors \texttt{ExampleBack} and \texttt{ExampleFrame}. To change the appearance of the examples, this style can be redefined.

% Predefined style:
\begin{verbatim}
\tcbset{
  docexample/.style={colframe=ExampleFrame,colback=ExampleBack,
  before skip=\medskipamount,after skip=\medskipamount,
  fontlower=\footnotesize}
}\end{verbatim}

/tcb/documentation listing options=\texttt{(key list)} (no default, initially \texttt{style=tcbdocumentation})
Sets the options from the package listings \textsuperscript{[6]}. They are used inside \texttt{dispExample} \textsuperscript{P.495} and \texttt{dispListing} \textsuperscript{P.496} to typeset the listings. Note that this is not identical to the key \texttt{/tcb/listing options} \textsuperscript{P.327} which is used for “normal” listings.
Used for \texttt{/tcb/listing engine} \textsuperscript{P.332= listings} only.

/tcb/documentation listing style=\texttt{(listing style)} (no default, initially \texttt{tcbdocumentation})
Abbreviation for \texttt{documentation listing options=\{style=\ldots\}}. This key sets a \texttt{(style)} for the \texttt{listings} package, see \textsuperscript{[6]}. Note that this is not identical to the key \texttt{/tcb/listing style} \textsuperscript{P.327} which is used for “normal” listings.
Used for \texttt{/tcb/listing engine} \textsuperscript{P.332= listings} only.

/tcb/documentation minted options=\texttt{(key list)} (no default, initially \texttt{tabsize=2,fontsize=\small})
Sets the options from the package \texttt{minted} \textsuperscript{[12]} which are used during typesetting of the listing, if used. Note that this is not identical to the key \texttt{/tcb/minted options} \textsuperscript{P.330} which is used for “normal” listings.
Used for \texttt{/tcb/listing engine} \textsuperscript{P.332= minted} only.

/tcb/documentation minted style=\texttt{(key list)} (no default, initially unset)
Sets a \texttt{(style)} known to Pygments \textsuperscript{[14]} for the package \texttt{minted} \textsuperscript{[12]}, if used. Note that this is not identical to the key \texttt{/tcb/minted style} \textsuperscript{P.331} which is used for “normal” listings.
Used for \texttt{/tcb/listing engine} \textsuperscript{P.332= minted} only.

/tcb/documentation minted language=\texttt{(programming language)} (no default, initially \texttt{latex})
Sets a \texttt{(programming language)} known to Pygments \textsuperscript{[14]} for the package \texttt{minted} \textsuperscript{[12]}, if used. Note that this is not identical to the key \texttt{/tcb/minted language} \textsuperscript{P.330} which is used for “normal” listings.
Used for \texttt{/tcb/listing engine} \textsuperscript{P.332= minted} only.

The following two keys are deprecated and without function (v3.50 and above). Use \texttt{/tcb/before} \textsuperscript{P.81} and \texttt{/tcb/after} \textsuperscript{P.81} with appropriate values instead. Also see \texttt{/tcb/docexample}.

/tcb/before example=\texttt{(macros)} (no default, initially empty)
Sets the \texttt{(macros)} which are executed before \texttt{dispExample} \textsuperscript{P.495} and \texttt{dispListing} \textsuperscript{P.496} additional to \texttt{/tcb/before} \textsuperscript{P.81}.

/tcb/after example=\texttt{(macros)} (no default, initially empty)
Sets the \texttt{(macros)} which are executed after \texttt{dispExample} \textsuperscript{P.495} and \texttt{dispListing} \textsuperscript{P.496} additional to \texttt{/tcb/after} \textsuperscript{P.81}.
Keyword used in docEnvironment[^P.489], docCommand[^P.487], etc. are printed boldface (or not). Since the typewriter font is used, the effect may be invisible with Computer Modern fonts or similar which do not have a bold variant. Note that references to keywords are not printed boldface at all.

```latex
\textbackslash LARGE
\textbackslash docAuxCommand\{fooaux\}, \textbackslash refCom\{tcbset\}
\textbackslash tcbset\{keywords bold=false\}
\textbackslash docAuxCommand\{fooaux\}, \textbackslash refCom\{tcbset\} \quad \textbackslash fooaux, \textbackslash tcbset \rightarrow \textbf{P.13}
```

```
\textbackslash tcbset\{index command=\myindexcommand\}
```

```
\textbackslash tcbset\{index command name=mydoc\}
```

```
\textbackslash tcbset\{index format=\textbackslash pgf\}
```

```
\textbackslash tcbset\{index actual=\textbackslash @\}
```

```
\textbackslash tcbset\{index quote=\textbackslash "\}
```

```
\textbackslash tcbset\{index level=\textbackslash !\}
```

```
\textbackslash tcbset\{index default settings\}
```

```
\textbackslash tcbset\{index german settings\}
```

```
\textbackslash tcbset\{index actual=\textbackslash =\}, index quote=\textbackslash \textbackslash !\}, index level=\textbackslash >\}
```
If set to `true`, the index entries are annotated with short descriptions given by `/tcb/doclang/environment `→ `P.512`, `/tcb/doclang/key` `→ `P.512`, and others.

If set to `true`, the index entries colorized according to the color settings given by `/tcb/color environment`, `/tcb/color key`, and others.

Sets the highlight color used by macro definitions.

Sets the highlight color used by environment definitions.

Sets the highlight color used by key definitions.

Sets the highlight color used by TikZ path operation definitions.

Sets the highlight color used by value definitions.

Sets the highlight color used by counter definitions.

Sets the highlight color used by length definitions.

Sets the highlight color used by color definitions.

Sets the highlight color for `/tcb/color command`, `/tcb/color environment`, `/tcb/color key`, `/tcb/color path`, `/tcb/color value`, `/tcb/color counter`, `/tcb/color length`, and `/tcb/color color`.

Sets the color used for optional arguments.

Sets the color used for faded text like \texttt{\textbackslash path in docPathOperation} `→ `P.492`.

Sets the color for all hyper-links, i.e. all internal and external links.
26.5 Language Option Keys

The following keys are provided for language specific settings. The English language is predefined.

/tcb/english language
(style, no value)
Sets all language specific settings to English.

/tcb/doclang/color=(text)
(no default, initially color)
Text used in the index for colors.

/tcb/doclang/colors=(text)
(no default, initially Colors)
Heading text in the index for colors.

/tcb/doclang/counter=(text)
(no default, initially counter)
Text used in the index for counters.

/tcb/doclang/counters=(text)
(no default, initially Counters)
Heading text in the index for counters.

/tcb/doclang/environment=(text)
(no default, initially environment)
Text used in the index for environments.

/tcb/doclang/environments=(text)
(no default, initially Environments)
Heading text in the index for environments.

/tcb/doclang/environment content=(text)
(no default, initially environment content)
Text used in docEnvironment \textsuperscript{+P.489}.

/tcb/doclang/index=(text)
(no default, initially Index)
Heading text for the index.

/tcb/doclang/key=(text)
(no default, initially key)
Text used in the index for keys.

/tcb/doclang/keys=(text)
(no default, initially Keys)
Heading text used in the index for keys.

/tcb/doclang/length=(text)
(no default, initially length)
Text used in the index for lengths.

/tcb/doclang/lengths=(text)
(no default, initially Lengths)
Heading text in the index for lengths.

/tcb/doclang/new=(text)
(no default, initially New)
Announcement text for new content.

/tcb/doclang/path=(text)
(no default, initially path operation)
Text used in the index for path operations.

/tcb/doclang/paths=(text)
(no default, initially Path operations)
Heading text in the index for path operations.

/tcb/doclang/pageshort=(text)
(no default, initially P.)
Short text for page references.

/tcb/doclang/updated=(text)
(no default, initially Updated)
Announcement text for updated content.

/tcb/doclang/value=(text)
(no default, initially value)
Text used in the index for values.

/tcb/doclang/values=(text)
(no default, initially Values)
Heading text in the index for values.
26.6 Predefined Colors of the Library

The following colors are predefined. They are used as default colors in some library commands.

- Option
- Definition
- ExampleFrame
- ExampleBack
- Hyperlink
- Fade
A Picture Credits

The following pictures were used inside this documentation.

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  - http://www.gimp.org
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https://www.unibw.de/bw/professuren/thomas-sturm.


Index

- key, 476
  
  foo path (horizontal then vertical) path
  operation, 502

/foo/myKey key, 506

! key, 476

0 value, 155
1 value, 155
2 value, 155

above key, 434
absquote environment, 496
add to height key, 55
add to list key, 105
add to natural height key, 55
add to width key, 34
adjust text key, 18
adjusted title key, 18
adjusted title after break key, 391
after key, 81
after app key, 453
after doc body key, 508
after doc body command key, 507
after doc body environment key, 507
after doc body key key, 507
after doc body path key, 508
after example key, 509
after lower key, 68
after lower app key, 453
after lower pre key, 453
after lower* key, 68
after pre key, 453
after skip key, 83
after skip balanced key, 82
after title key, 64
after title app key, 452
after title pre key, 452
after upper key, 66
after upper app key, 452
after upper pre key, 452
after upper* key, 66
alert key, 281
all key, 10
all value, 48, 49, 309, 393, 396
ams align key, 376
ams align lower key, 376
ams align upper key, 376
ams align* key, 376
ams align* lower key, 376
ams align* upper key, 376
ams equation key, 375
ams equation lower key, 375
ams equation upper key, 375
ams equation* key, 375
ams equation* lower key, 375
ams equation* upper key, 375

ams gather key, 377
ams gather lower key, 377
ams gather upper key, 377
ams gather* key, 377
ams gather* lower key, 377
ams gather* upper key, 377
ams nodisplayskip key, 378
ams nodisplayskip lower key, 378
ams nodisplayskip upper key, 378
arc key, 36
arc is angular key, 38
arc is curved key, 38
areasize value, 448
areasize* value, 448
as-is value, 269
at key, 435
at begin tikz key, 201
at begin tikz reset key, 201
at end tikz key, 201
at end tikz reset key, 201
attach boxed title to bottom key, 165
attach boxed title to bottom center key, 164
attach boxed title to bottom left key, 164
attach boxed title to bottom right key, 164
attach boxed title to bottom text left key, 164
attach boxed title to bottom text right key, 164
attach boxed title to bottom* key, 165
attach boxed title to bottom left key, 165
attach boxed title to bottom center key, 165
attach boxed title to top center key, 163
attach boxed title to top left key, 163
attach boxed title to top right key, 163
attach boxed title to top text left key, 163
attach boxed title to top text right key, 163
attach boxed title to top* key, 165
attach title key, 20
attach title to upper key, 20
auto value, 103, 371
auto counter key, 114
auto limited value, 103
auto outer arc key, 38
autoparskip key, 85
base value, 86
base color key, 289
baseline key, 86
baselineskip value, 393
beamer key, 244
beamer Skin, 244
beamer alerted key, 281
beamer hidden key, 280
colors key, 512
colspacing key, 428
coltext key, 28
coltitle key, 28
column key, 432
column* key, 432
columns key, 428
colupper key, 28
color key, 511
color length key, 511
color option key, 511
color path key, 511
color value key, 511
Colors
Definition, 513
ExampleBack, 513
ExampleFrame, 513
Fade, 513
foocolor, 494
Hyperlink, 513
Option, 513
tcbcolback, 153
tcbcolbacklower, 153
tcbcolbacktitle, 153
tcbcolframe, 153
tcbcollower, 153
tcbcoltitle, 153
tcbcolupper, 153
color counter key, 511
color definition key, 511
color environment key, 511
color fade key, 511
color from key, 289
color hyperlink key, 511
color key key, 511
dash value, 119
dash hang value, 119
edefexample environment, 495
defexample* environment, 495
deflisting environment, 496
deflisting* environment, 496
default minted options key, 331
definition color key, 367
description color key, 367
description delimiters key, 367
description delimiters none key, 367
description delimiters parenthesis key, 367
description font key, 368
description formatter key, 368
detach title key, 20
direct value, 290
dispExample environment, 495
dispExample* environment, 495
dispListing environment, 496
dispListing* environment, 496
do not store to box array key, 418
doc value, 510
doc description key, 502
doc head key, 506
doc head command key, 505
doc head environment key, 506
doc head key key, 506
doc head path key, 506
doc index key, 502
doc into index key, 503
doc keypath key, 501
doc label key, 502
doc left key, 504
doc left indent key, 504
doc marginnote key, 503
doc name key, 501
doc new key, 503
doc new and updated key, 503
doc no index key, 503
doc parameter key, 501
doc raster key, 505
doc raster command key, 505
doc raster environment key, 505
doc raster key key, 505
doc raster path key, 505
doc right key, 504
doc right indent key, 504
doc sort index key, 502
doc updated key, 503
docAuxCommand, 493
docAuxCommand*, 493
docAuxEnvironment, 493
docAuxEnvironment*, 493
docAuxKey, 493

counter key, 512
Counters
foocounter, 493
tcbrastercolumn, 300
tcbrasternum, 300
tcbrasterrow, 300
counters key, 512
coverage key, 429
Crefname key, 117
crefname key, 117
\cs, 494

519
check odd page, 107
circular arc, 37
clip lower, 185
clip title, 184
clip upper, 184
clip watermark, 180
code, 112
colback, 27
colbacklower, 232
colbacktitle, 27
colframe, 27
colower, 28
color color, 511
color command, 511
color counter, 511
color definition, 511
color environment, 511
color fade, 511
color hyperlink, 511
color key, 511
color length, 511
color option, 511
color path, 511
color value, 511
coltext, 28
coltitle, 28
colupper, 28
comment, 333
comment above listing, 341
comment above* listing, 341
comment and listing, 336
comment only, 333
comment outside listing, 339
comment side listing, 338
comment style, 336
compilable listing, 345
compress page, 393
default minted options, 331
description color, 367
description delimiters, 367
description delimiters none, 367
description delimiters parenthesis, 367
description font, 368
description formatter, 368
detach title, 20
do not store to box array, 418
doc description, 502
doc head, 506
doc head command, 505
doc head environment, 506
doc head key, 506
doc head path, 506
doc index, 502
doc into index, 503
doc keypath, 501
doc label, 502
doc left, 504
doc left indent, 504
doc marginnote, 503
doc name, 501
doc new, 503
doc new and updated, 503
doc no index, 503
doc parameter, 501
doc raster, 505
doc raster command, 505
doc raster environment, 505
doc raster key, 505
doc raster path, 505
doc right, 504
doc right indent, 504
doc sort index, 502
doc updated, 503
docexample, 509
documentation listing options, 509
documentation listing style, 509
documentation minted language, 509
documentation minted options, 509
documentation minted style, 509
draft, 262
draftmode, 213
drop fuzzy midday shadow, 192
drop fuzzy shadow, 191
drop fuzzy shadow east, 195
drop fuzzy shadow north, 195
drop fuzzy shadow northeast, 195
drop fuzzy shadow northwest, 195
drop fuzzy shadow south, 194
drop fuzzy shadow southeast, 194
drop fuzzy shadow southwest, 194
drop fuzzy shadow west, 194
drop large lifted shadow, 196
drop lifted shadow, 196
drop midday shadow, 191
drop shadow, 191
drop shadow east, 194
drop shadow north, 193
drop shadow northeast, 194
drop shadow northwest, 193
drop shadow south, 193
drop shadow southeast, 193
drop shadow southwest, 193
drop shadow west, 193
drop small lifted shadow, 196
empty, 251
enforce breakable, 391
english language, 512
enhanced, 218
enhanced jigsaw, 224
enhanced standard, 220
enhanced standard jigsaw, 224
enlarge bottom at break by, 89
enlarge bottom by, 89
enlarge bottom finally by, 88
enlarge by, 90
enlarge left by, 89
enlarge right by, 89
enlarge top at break by, 89
enlarge top by, 89
enlarge top initially by, 88
enlargepage, 392
enlargepage flexible, 393
equal height group, 61
every box, 97
every box on higher layers, 98
every box on layer n, 98
every float, 80
every listing line, 328
every listing line*, 328
extend freelance, 264
extend freelancefirst, 264
extend freelancelast, 264
extend freelancemiddle, 264
external, 111
externalize example, 481
externalize example!, 481
externalize listing, 481
externalize listing!, 481
extras, 397
extras broken, 397
extras broken pre, 461
extras first, 397
extras first and middle, 398
extras first and middle pre, 461
extras first pre, 461
extras last, 397
extras last pre, 461
extras middle, 397
extras middle and last, 397
extras middle and last pre, 461
extras middle pre, 461
extras pre, 461
extras title after break, 398
extras unbroken, 397
extras unbroken and first, 397
extras unbroken and first pre, 461
extras unbroken and last, 397
extras unbroken and last pre, 461
extras unbroken pre, 461
extrude bottom by, 96
extrude by, 96
extrude left by, 95
extrude right by, 95
extrude top by, 96
fill downwards, 93
finish, 206
finish broken, 207
finish broken pre, 459
finish fading vignette, 296
finish first, 207
finish first and middle, 207
finish first and middle pre, 459
finish first pre, 459
finish last, 207
finish last pre, 459
finish middle, 207
finish middle and last, 207
finish middle and last pre, 459
finish middle pre, 459
finish pre, 459
finish raised fading vignette, 295
finish unbroken, 207
finish unbroken and first, 207
finish unbroken and first pre, 459
finish unbroken and last, 207
finish unbroken and last pre, 459
finish unbroken pre, 459
finish vignette, 295
fit, 442
fit algorithm, 448
fit basedim, 443
fit fontsize macros, 444
fit height from, 447
fit height plus, 445
fit maxfontdiff, 450
fit maxfontdiffgap, 450
fit maxstep, 450
fit maxwidthdiff, 450
fit maxwidthdiffgap, 450
fit skip, 443
fit to, 443
fit to height, 443
fit warning, 450
fit width from, 446
fit width plus, 445
flip title, 165
float, 79
float*, 79
floatplacement, 79
flush left, 91
flush right, 91
flushleft lower, 32
flushleft title, 33
flushleft upper, 32
flushright lower, 32
flushright title, 33
flushright upper, 32
fontlower, 29
fonttitle, 29
fontupper, 29
force nobeforeafter, 81
frame code, 145
frame code app, 459
frame code pre, 459
frame empty, 145
frame engine, 142
frame hidden, 157
frame style, 156
frame style image, 156
frame style tile, 157
freelance, 264
freeze extension, 348
freeze file, 348
freeze jpg, 348
freeze none, 348
squeezed title, 19
squeezed title*, 19
standard, 216
standard jigsaw, 217
step, 104
step and label, 104
store to box array, 416
subtitle style, 21
tabulars, 70
tabulars*, 70	
tabularx, 71
tabularx*, 71
tcbimage comment, 334
tcbox raise, 102
tcbox raise base, 102
tcbox width, 103
tempfile, 102
terminator sign, 368
terminator sign colon, 369
terminator sign dash, 369
terminator sign none, 369
text above listing, 340
text above* listing, 340
text and listing, 332
text fill, 69
text height, 54
text only, 333
text outside listing, 338
text side listing, 337
text width, 34
theorem, 373
theorem full label supplement, 370
theorem hanging indent, 371
theorem label supplement, 370
theorem name, 372
theorem name and number, 372
theorem number, 372
theorem number and name, 372
theorem style, 379
tikz, 201
tikz lower, 72
tikz reset, 201
tikz upper, 72
tikznode, 73
tikznode boxed title, 173
tikznode lower, 73
tikznode upper, 73	
tile, 240
title, 18
title after break, 391
title code, 147
title code app, 460
title code pre, 460
title empty, 147
title engine, 143
title filled, 27
title hidden, 160
title style, 159
title style image, 160
title style tile, 160
titlebox, 19
titlerule, 36
titlerule style, 161
toggle enlargement, 92
toggle left and right, 46
top, 42
toprule, 35
toprule at break, 395
topsep at break, 395
toptitle, 42
unbreakable, 391
underlay, 204
underlay boxed title, 205
underlay boxed title pre, 458
underlay broken, 205
underlay broken pre, 458
underlay first, 205
underlay first and middle, 205
underlay first and middle pre, 458
underlay first pre, 458
underlay last, 205
underlay last pre, 458
underlay middle, 205
underlay middle and last, 205
underlay middle and last pre, 458
underlay middle pre, 458
underlay pre, 458
underlay raised fading vignette, 294
underlay raised shading vignette, 294
underlay shade in vignette, 294
underlay unbroken, 205
underlay unbroken and first, 205
underlay unbroken and first pre, 458
underlay unbroken and last, 205
underlay unbroken and last pre, 458
underlay unbroken pre, 458
underlay vignette, 293
upperbox, 22
use color stack, 393
use height from group, 63
valign, 33
valign lower, 33
valign scale limit, 33
valign upper, 33
varwidth boxed title, 173
varwidth boxed title*, 173
varwidth upper, 73
verbatim, 462
verbatim ignore percent, 134
vfill before first, 396
visible, 22
void, 113
watermark color, 179
watermark graphics, 175
watermark graphics app, 457
watermark graphics app on, 457
watermark graphics on, 175
watermark graphics pre, 457
watermark graphics pre on, 457
watermark opacity, 177
watermark overzoom, 178
watermark shrink, 178
watermark stretch, 179
watermark text, 174
watermark text app, 456
watermark text app on, 456
watermark text on, 174
watermark text pre, 456
watermark text pre on, 456
watermark tikz, 176
watermark tikz app, 457
watermark tikz app on, 457
watermark tikz on, 176
watermark tikz pre, 457
watermark tikz pre on, 457
watermark zoom, 177
widget, 248
width, 34
/tcb/boxtitle/
xshift, 166
yshift, 166
yshift*, 166
yshifttext, 166
/tcb/doclang/
color, 512
colors, 512
counter, 512
counters, 512
environment, 512
environment content, 512
environments, 512
index, 512
key, 512
keys, 512
length, 512
lengths, 512
new, 512
pageshort, 512
path, 512
paths, 512
updated, 512
value, 512
values, 512
/tcb/external/
~, 476
!, 476
clear preamble, 483
clear preclass, 483
compiler, 482
environment, 482
environment with percent, 482
externalize, 476
force remake, 476
input source on error, 482
minipage, 482
name, 478
PassOptionsToClass, 483
PassOptionsToPackage, 483
plain, 482
preamble, 483
preamble tcbset, 483
preclass, 483
prefix, 476
runner, 476
runs, 482
safety, 482
/tcb/library/
all, 10
breakable, 9
documentation, 10
external, 10
fitting, 9
hooks, 9
listings, 9
listingsutf8, 9
magazine, 9
many, 10
minted, 9
most, 10
poster, 9
raster, 9
skins, 9
theorems, 9
vignette, 9
xparse, 10
/tcb/new/
auto counter, 114
blend into, 118
Crefname, 117
crefname, 117
list inside, 121
list type, 121
no counter, 115
number format, 116
number freestyle, 116
number within, 116
reset counter on overlays, 115
use counter, 115
use counter from, 115
use counter*, 115
/tcb/poster/
colspaceing, 428
columns, 428
height, 428
prefix, 428
rows, 428
rowspaceing, 428
showframe, 428
spacing, 428
width, 428
/tcb/posterloc/
above, 434
at, 435
below, 434
\oarg, 494
octogon arc key, 37
off value, 450, 510
on value, 450
on line key, 102
only key, 279
opacityback key, 51
opacitybacklower key, 232
opacitybacktitle key, 51
opacityfill key, 51
opacityframe key, 51
opacitylower key, 52
opacitytext key, 52
opacitytitle key, 52
opacityupper key, 52
Option color, 513
outer arc key, 38
outside node key, 287
over node key, 287
over node offset key, 287
overlay key, 74
overlay app key, 454
overlay broken key, 75
overlay broken app key, 455
overlay broken pre key, 455
overlay first key, 75
overlay first and middle key, 75
overlay first and middle app key, 455
overlay first and middle pre key, 455
overlay first app key, 454
overlay first pre key, 454
overlay last key, 75
overlay last app key, 455
overlay last pre key, 455
overlay middle key, 75
overlay middle and last key, 75
overlay middle and last app key, 455
overlay middle and last pre key, 455
overlay middle app key, 455
overlay middle pre key, 455
overlay pre key, 454
overlay unbroken key, 75
overlay unbroken and first key, 75
overlay unbroken and first app key, 455
overlay unbroken and first pre key, 455
overlay unbroken and last key, 75
overlay unbroken and last app key, 455
overlay unbroken and last pre key, 455
overlay unbroken app key, 454
overlay unbroken pre key, 454
oversize key, 45

pad after break key, 395
pad at break key, 395
pad at break* key, 395
pad before break key, 395
pad before break* key, 395
pageshort key, 512
parbox key, 101
parfillskip restore key, 87

parskip key, 85
PassOptionsToClass key, 483
PassOptionsToPackage key, 483
path key, 512
path value, 142, 143
Path operations
foo path (horizontal then vertical), 502
fooop, 492
pathfirst value, 142, 143
pathfirstjigsaw value, 142
pathjigsaw value, 142
pathlast value, 142, 143
pathlastjigsaw value, 142
pathmiddle value, 142, 143
pathmiddlejigsaw value, 142
paths key, 512
pdf comment key, 335
df extension key, 336
\pdfpages, 268
pgf value, 510
pgfchapter value, 510
pgfsection value, 510
phantom key, 104
phantomlabel key, 104
placeholder key, 437
plain key, 482
plain value, 379
plain apart value, 380
portrait value, 269
portrait* value, 269
poster key, 9, 428
\posterbox, 431
posterboxenv environment, 431
preamble key, 483
preamble tcbset key, 483
preclass key, 483
prefix key, 428, 476
process code key, 345
\ProvideTCBInputListing, 472
\ProvideTCBListing, 470
\ProvideTCBox, 467
\ProvideTCBoxFit, 473
\ProvideTColorBox, 465
\ProvideTotalTCBox, 469
\ProvideTotalTCBoxFit, 474
\ProvideTotalTColorBox, 466
raised color key, 289
raster key, 9
raster after skip key, 306
raster before skip key, 306
raster column n key, 310
raster column skip key, 307
raster columns key, 304
raster equal height key, 309
raster equal height group key, 309
raster equal skip key, 306
raster even column key, 310
raster even number key, 311
raster even row key, 311
raster every box key, 310
raster force size key, 310
raster halign key, 308
raster height key, 306
raster left skip key, 307
raster multicolumn key, 312
raster multirow key, 313
raster number n key, 311
raster odd column key, 310
raster odd number key, 311
raster force size key, 310
raster halign key, 308
raster height key, 306
raster left skip key, 307
raster multicolumn key, 312
raster multirow key, 313
raster number n key, 311
raster odd column key, 310
raster odd number key, 311
raster reset key, 310
raster right skip key, 307
raster row m key, 311
raster row m column n key, 311
raster row skip key, 307
raster rows key, 304
raster valign key, 308
raster width key, 304
raster width flush left key, 305
raster width flush right key, 305
record key, 135
\refAux, 499
\refAuxcs, 499
\refCom, 498
\refCom*, 498
\refEnv, 498
\refEnv*, 498
\refKey, 498
\refKey*, 498
\refPathOperation, 499
\refPathOperation*, 499
remake key, 111
remember key, 202
remember as key, 203
\renewtcbexternalizeenvironment, 484
\renewtcbexternalizetcolorbox, 485
\renewTCBInputListing, 472
\renewTCBInputListing, 326
\renewTCListing, 470
\renewTCListing, 325
\renewTCBox, 467
\renewtcbox, 16
\renewTCBoxFit, 473
\renewtcbxboxfit, 440
\renewtcbtheorem, 363
\renewTColorBox, 465
\renewtcolorbox, 15
\renewTotalTCBox, 469
\renewTotalTCBoxFit, 474
\renewTotalTColorBox, 466
reset key, 112
reset and store to box array key, 418
reset box array key, 415
reset counter on overlays key, 115
right key, 40
right skip key, 84
right* key, 41
righthand ratio key, 127
righthand width key, 126
rightlower key, 42
rightrule key, 35
righttitle key, 41
rightupper key, 41
rotate key, 202
rounded corners key, 49
row key, 433
rows key, 428
rows value, 309
rowspacing key, 428
rowspan key, 433
run arara key, 347
run biber key, 347
run bibtex key, 347
run dvips key, 347
run latex key, 347
run lualatex key, 347
run makeindex key, 347
run pdflatex key, 345
run ps2pdf key, 347
run system command key, 345
run xelatex key, 347
runner key, 476
runs key, 482
safety key, 482
savedelimiter key, 26
savelowerto key, 24
saveto key, 23
scale key, 202
scale value, 33
scale* value, 33
scope key, 289
segmentation at break key, 396
segmentation code key, 146
segmentation code app key, 460
segmentation code pre key, 460
segmentation empty key, 146
segmentation engine key, 143
segmentation hidden key, 159
segmentation style key, 159
semi east fading, 290
semi fade in key, 291
semi fade out key, 291
semi north fading, 290
semi south fading, 290
semi west fading, 290
separator sign key, 366
separator sign colon key, 366
separator sign dash key, 366
separator sign none key, 366
sequence key, 436
shadow key, 197
sharp corners key, 48
sharpish corners key, 49
shield externalize key, 111
show bounding box key, 188
showframe key, 428
shrink break goal key, 393
shrink tight key, 95
sidebyside key, 123
sidebyside adapt key, 130
sidebyside align key, 124
sidebyside gap key, 126
sidebyside switch key, 132
size key, 44, 288
skin key, 141
skin first key, 141
skin first is subskin of key, 148
skin last key, 141
skin last is subskin of key, 148
skin middle key, 141
skin middle is subskin of key, 148
\skinExampleSet, 215

Skins
  beamer, 244
  beamerfirst, 246
  beamermiddle, 246
  bicolor, 230
  bicolor jigsaw, 236
  bicolorfirst, 233
  bicolorfirst jigsaw, 237
  bicolorlast, 235
  bicolorlast jigsaw, 239
  bicolormiddle, 234
  bicolormiddle jigsaw, 238
  draft, 262
  empty, 251
  emptyfirst, 254
  emptylast, 256
  emptymiddle, 255
  enhanced, 218
  enhanced jigsaw, 224
  enhancedfirst, 222
  enhancedfirst jigsaw, 225
  enhancedlast, 223
  enhancedlast jigsaw, 229
  enhancedmiddle, 222
  enhancedmiddle jigsaw, 226
  freelance, 264
  freelancefirst, 264
  freelancelast, 264
  freelancemiddle, 264
  spartan, 261
  standard, 216
  standard jigsaw, 217
  tile, 240
  tilefirst, 241
  tilelast, 243
  tilemiddle, 242
  widget, 248
  widgetfirst, 249
  widgetlast, 250
  widgetmiddle, 249

skins key, 9
small value, 44
smart shadow arc key, 199
south fading, 290
south value, 48, 49
south size key, 287
south style key, 288
southeast value, 48, 49
southwest value, 48, 49
space key, 58
space to key, 59
space to both key, 59
space to lower key, 58
space to upper key, 58
spacing key, 428
span key, 433
spartan key, 261
spartan Skin, 261
spartan value, 142, 143
split key, 60
spread key, 94
spread downwards key, 94
spread inwards key, 93
spread outwards key, 93
spread sidewards key, 94
spread upwards key, 94
spread upwards* key, 94
square key, 58
squeeze value, 448
squeezed title key, 19
squeezed title* key, 19
standard key, 216
standard Skin, 216
standard value, 142, 143, 167, 379
standard jigsaw key, 217
standard jigsaw Skin, 217
step key, 104
step and label key, 104
store to box array key, 416
subtitle style key, 21

tables value, 118
tabulars key, 70
tabulars* key, 70
tabularx key, 71
tabularx* key, 71
tcb fill frame key, 162
tcb fill interior key, 162
tcb fill title key, 162
\tcbbreak, 403
tcbclipframe environment, 181
tcbclipinterior environment, 183
tcbcliptitle environment, 183
tcbcolback color, 153
tcbcolbacklower color, 153
tcbcolbacktitle color, 153
tcbcolframe color, 153
tcbcollower color, 153
tcbcoltitle color, 153
tcbcolupper color, 153
<table>
<thead>
<tr>
<th>Key</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textcolorboxnumber</td>
<td>110</td>
</tr>
<tr>
<td>\textcolorboxpage</td>
<td>110</td>
</tr>
<tr>
<td>tight value</td>
<td>44</td>
</tr>
<tr>
<td>tikz key</td>
<td>201</td>
</tr>
<tr>
<td>tikz lower key</td>
<td>72</td>
</tr>
<tr>
<td>tikz reset key</td>
<td>201</td>
</tr>
<tr>
<td>tikz upper key</td>
<td>72</td>
</tr>
<tr>
<td>tikznode key</td>
<td>73</td>
</tr>
<tr>
<td>tikznode boxed title key</td>
<td>173</td>
</tr>
<tr>
<td>tikznode lower key</td>
<td>73</td>
</tr>
<tr>
<td>tikznode upper key</td>
<td>73</td>
</tr>
<tr>
<td>tile key</td>
<td>240</td>
</tr>
<tr>
<td>tile Skin</td>
<td>240</td>
</tr>
<tr>
<td>tilefirst Skin</td>
<td>241</td>
</tr>
<tr>
<td>tilelast Skin</td>
<td>243</td>
</tr>
<tr>
<td>tilemiddle Skin</td>
<td>242</td>
</tr>
<tr>
<td>title key</td>
<td>18</td>
</tr>
<tr>
<td>title value</td>
<td>44, 167</td>
</tr>
<tr>
<td>title after break key</td>
<td>391</td>
</tr>
<tr>
<td>title code key</td>
<td>147</td>
</tr>
<tr>
<td>title code app key</td>
<td>460</td>
</tr>
<tr>
<td>title code pre key</td>
<td>460</td>
</tr>
<tr>
<td>title empty key</td>
<td>147</td>
</tr>
<tr>
<td>title engine key</td>
<td>143</td>
</tr>
<tr>
<td>title filled key</td>
<td>27</td>
</tr>
<tr>
<td>title hidden key</td>
<td>160</td>
</tr>
<tr>
<td>title style key</td>
<td>159</td>
</tr>
<tr>
<td>title style image key</td>
<td>160</td>
</tr>
<tr>
<td>title style tile key</td>
<td>160</td>
</tr>
<tr>
<td>titlebox key</td>
<td>19</td>
</tr>
<tr>
<td>titlerule key</td>
<td>36</td>
</tr>
<tr>
<td>titlerule style key</td>
<td>161</td>
</tr>
<tr>
<td>toggle enlargement key</td>
<td>92</td>
</tr>
<tr>
<td>toggle left and right key</td>
<td>46</td>
</tr>
<tr>
<td>top key</td>
<td>42</td>
</tr>
<tr>
<td>top value</td>
<td>33, 86, 124, 308</td>
</tr>
<tr>
<td>top seam value</td>
<td>124</td>
</tr>
<tr>
<td>toprule key</td>
<td>35</td>
</tr>
<tr>
<td>toprule at break key</td>
<td>395</td>
</tr>
<tr>
<td>topsep at break key</td>
<td>395</td>
</tr>
<tr>
<td>toptitle key</td>
<td>42</td>
</tr>
<tr>
<td>true value</td>
<td>87, 390</td>
</tr>
<tr>
<td>unbreakable key</td>
<td>391</td>
</tr>
<tr>
<td>unbroken value</td>
<td>174–176</td>
</tr>
<tr>
<td>unbroken and first value</td>
<td>174–176</td>
</tr>
<tr>
<td>underlay key</td>
<td>204</td>
</tr>
<tr>
<td>underlay boxed title key</td>
<td>205</td>
</tr>
<tr>
<td>underlay boxed title pre key</td>
<td>458</td>
</tr>
<tr>
<td>underlay broken key</td>
<td>205</td>
</tr>
<tr>
<td>underlay broken pre key</td>
<td>458</td>
</tr>
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<td>293</td>
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<tr>
<td>unlimited value</td>
<td>389, 390</td>
</tr>
<tr>
<td>updated key</td>
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<td>uphill value</td>
<td>48, 49</td>
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<td>use color stack key</td>
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<td>use counter key</td>
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<td>\useboxarray</td>
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</tbody>
</table>

Values

- 0, 155
- 1, 155
- 2, 155
- all, 48, 49, 309, 393, 396
- areasize, 448
- areasize*, 448
- as-is, 269
- auto, 103, 371
- auto limited, 103
- base, 86
- baselineskip, 393
- both, 130
- bottom, 33, 86, 124, 308
- bottom seam, 124
- break, 380
- broken, 174–176
- center, 30, 33, 86, 124, 308
- center seam, 124
- change, 380
- change apart, 380
- change break, 380
- change standard, 379
- clipped, 290
- colon, 119
- colon hang, 119
- copy, 167
- dash, 119
- dash hang, 119
- direct, 290

538
watermark text pre on key, 456
watermark tikz key, 176
watermark tikz app key, 457
watermark tikz app on key, 457
watermark tikz on key, 176
watermark tikz pre key, 457
watermark tikz pre on key, 457
watermark zoom key, 177
west fading, 290
west value, 48, 49
west size key, 287
west style key, 289
widget key, 248
widget Skin, 248
widgetfirst Skin, 249
widgetlast Skin, 250
widgetmiddle Skin, 249
width key, 34, 428
xmax key, 286
xmin key, 286
xparse key, 10
xshift key, 166, 437
ymax key, 286
ymin key, 286
yshift key, 166, 438
yshift* key, 166
yshifttext key, 166