

# User's Guide to the Beamer Class, Version 0.6

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September 22, 2003

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# 1 Introduction

This user's guide explains the functionality of the BEAMER class. It is a L<sup>A</sup>T<sub>E</sub>X class that allows you to create a beamer presentation. It can also be used to create slides. It behaves similarly to other packages like PROSPER, but has the advantage that it works together directly with `pdflatex`, but also with `dvips`.

To use the beamer class, proceed as follows:

1. Specify `beamer` as document class instead of `article`.
2. Structure your L<sup>A</sup>T<sub>E</sub>X text using `section` and `subsection` commands.
3. Place the text of the individual slides inside `frame` commands.
4. Run `pdflatex` on the text (or `latex`, `dvips`, and `ps2pdf`).

The beamer class has several useful features: You don't need any external programs to use it other than `pdflatex`, but it works also with `dvips`. You can easily and intuitively create sophisticated overlays. Finally, you can easily change the whole slide theme or only parts of it. The following code shows a typical usage of the class.

```
\documentclass{beamer}

\usepackage{beamerthemesplit}

\title{Example Presentation Created with the Beamer Package}
\author{Till Tantau}
\date{\today}

\begin{document}

\frame{\titlepage}

\section[Outline]{}
\frame{\tableofcontents}

\section{Introduction}
\subsection{Overview of the Beamer Class}
\frame
{
  \frametitle{Features of the Beamer Class}

  \begin{itemize}
    \item<1-> Normal LATEX class.
    \item<2-> Easy overlays.
    \item<3-> No external programs needed.
  \end{itemize}
}
\end{document}
```

Run `pdflatex` on this code (twice) and then use, for example, the Acrobat Reader to present the resulting `.pdf` file in a presentation. You can also, alternatively, use `dvips`; see Section 2.4.2 for details.

As can be seen, the text looks almost like a normal  $\text{\LaTeX}$  text. The main difference is the usage of the `\frame` command. This command takes one parameter, which is the text that should be shown on the frame. Typically, the contents of a frame is shown on a single slide. However, in case you use overlay commands inside a frame, a single frame command may produce several slides. An example is the last frame in the above example. There, the `\item` commands are followed by *overlay specifications* like `<1->`, which means “from slide 1 on.” Such a specification causes the item to be shown only on the specified slides of the frame (see Section 3 for details). In the above example, a total of five slides are produced: a title page slide, an outline slide, a slide showing only the first of the three items, a slide showing the first two of them, and a slide showing all three items.

To structure your text, you can use the commands `\section` and `\subsection`. These commands will not only create a table of contents, but will also create navigation bars.

## 2 Workflow

This section presents a possible workflow for creating a beamer presentation and possibly a handout to go along with it. Both, technical questions are addressed, like which programs to call with which parameters, and hints are given on how to create a presentation. If you are already a pro at creating presentations, you may wish to skip the first of the following steps and only have a look at how to convert the `.tex` file into a `.pdf` or `.ps` file.

### 2.1 Step Zero: Know the Time Constraints

When you start to create a presentation, the very first thing you should worry about is the amount of time you have for your presentation. Depending on the occasion, this can be anything between 2 minutes and two hours. A simple rule for the number of frames is that you should have at most one frame per minute.

In most situations, you will have less time for your presentation than you would like. *Do not try to squeeze more into a presentation than time allows for.* No matter how important some detail seems to you, it is better to leave it out, but get the main message across, than getting neither the main message nor the detail across.

In many situations, a quick appraisal of how much time you have will show that you won’t be able to mention certain details. Knowing this can save you hours of work on preparing slides that you would have to remove later anyway.

### 2.2 Step One: Setup the Files

It is advisable that you create a folder for each presentation. Even though your presentation will usually reside in a single file,  $\text{\TeX}$  produces so many extra files that things can easily get very confusing otherwise. The folder’s name should ideally start with the date of your talk in ISO format (like 2003-12-25 for a Christmas talk), followed by some reminder text of what the talk is all about. Putting the date at the front in this format causes your presentation folders to be listed nicely when you have several of them residing in one directory. If you use an extra directory for each presentation, you can call your main file `main.tex`.

To create an initial `main.tex` file for your talk, copy an existing file (like the file `beamerexample.tex` that comes along with the contribution) and delete everything that is not going to be part of your talk. Adjust the `\author{}` and other fields as appropriate.

### 2.3 Step Two: Structure Your Presentation

With the time constraints in mind, make a mental inventory of the things you can reasonably talk about within the time available. Then categorize the inventory into sections and subsections. Put `\section{}` and `\subsection{}` commands into the (more or less empty) main file. Do not create any frames until you have a first working version of a possible table of contents. Do not feel afraid to change it later on as you work on the talk.

You should not use more than four sections and not less than two. Even four sections is usually too much, unless they follow a very easy pattern. Five and more sections are simply too hard to follow for the audience. After all, when you present the table of contents, the audience will not yet really be able to grasp the importance and relevance of the different sections and will most likely have forgotten them by the time you reach them.

Ideally, a table of contents should be understandable by itself. In particular, it should be comprehensible *before* someone has heard your talk. Keep section and subsection titles short and simple.

Both the sections and the subsections should follow a logical pattern. Begin with an explanation of what your talk is all about (do not assume that everyone knows this). Then explain what you or someone else has found out concerning the subject matter. Always conclude your talk with a summary that repeats the main message of the talk in a short and simple way. People pay most attention at the beginning and at the end of talks. The summary is your “second chance” to get across a message.

## 2.4 Step Three: Creating a PDF or PostScript File

Once a first version of the structure is finished, you should create a first PDF or PostScript file of your (still empty) talk. This file will only contain the title page and the table of contents. The file might look like this:

```
\documentclass{beamer}
% This is the file main.tex

\usepackage{beamerthemesplit}

\title{Example Presentation Created with the Beamer Package}
\author{Till Tantau}
\date{\today}

\begin{document}

\frame{\titlepage}

\section[Outline]{}
\frame{\tableofcontents}

\section{Introduction}
\subsection{Overview of the Beamer Class}
\subsection{Overview of Similar Classes}

\section{Usage}
\subsection{...}
\subsection{...}

\section{Examples}
\subsection{...}
\subsection{...}

\end{document}
```

### 2.4.1 Creating PDF

To create a PDF version of this file, run the program `pdflatex` on `main.tex` at least twice (the greater-than sign is the prompt):

```
> pdflatex main.tex
... lots of output ...
```

```
> pdflatex main.tex
... lots of output ...
```

Your need to run it twice, so that  $\text{\TeX}$  can create the table of contents.

You can next use a program like the Acrobat Reader or `xpdf` to view the resulting presentation.

```
> acroread main.pdf
```

When printing a presentation, make sure that the option “expand small pages to paper size” is enabled. This is necessary, because slides are only 128mm times 96mm.

### 2.4.2 Creating PostScript

To create a PostScript version of this file, you first need to run `latex` twice, then run `dvips`.

```
> pdflatex main.tex
... lots of output ...
> pdflatex main.tex
... lots of output ...
> dvips -P pdf -T 128mm,96mm main.dvi
```

The first of the two options (`-P pdf`) tells `dvips` to use Type 1 outline fonts instead of the usual Type 3 bitmap fonts. You may wish to omit this option if there is a problem with it. The second option (`-T 128mm,96mm`) tells `dvips` that each slide is 128mm by 96mm. If you do not specify this option, the slide will be “kind of lost” on a big blank page.

If you wish each slide to completely fill a letter-sized page, use the following commands instead:

```
> dvips -P pdf -t landscape -t letter -O 151.4mm,119.9mm main.dvi -o main.temp.ps
> psnup -1 -W96mm -H128mm -p letter main.temp.ps main.ps
```

For A4-sized paper, use:

```
> dvips -P pdf -t landscape -t a4 -O 169mm,114mm main.dvi -o main.temp.ps
> psnup -1 -W96mm -H128mm -p a4 main.temp.ps main.ps
```

In order to create a white margin around the whole page (which is sometimes useful for printing), add the option `-m 1cm` to the options of `psnup`.

To put two or four slides on one page, use `-2`, respectively `-4` instead of `-1` as the first parameter for `psnup`. In this case, you may wish to add the option `-b 1cm` to add a bit of space around the individual slides.

You can convert a PostScript file to a pdf file using

```
> ps2pdf main.ps main.pdf
```

## 2.5 Step Four: Create Frames

Once the table of contents looks satisfactory, start creating frames for your presentation. When creating frames, follow the following rules:

- Put a title on each frame. Ideally, the title explains the contents of the frame to people who did not follow all details on the slide.
- Ideally, titles on consecutive frames should “tell a story” all by themselves.
- A frame with too little on it is better than a frame with too much on it.
- Do not assume that everyone in the audience is an expert on the subject matter. Even if the people listening to you should be experts, they may last have heard about things you consider obvious several years ago. You should always have the time for a quick reminder of what exactly a “semantical complexity class” or an “ $\omega$ -complete partial ordering” is.

- Never put anything on a slide that you are not going to explain during the talk. However, you may explain things that are not on a frame.
- *Never* use a smaller font size to “squeeze more on a frame.”
- Use colors sparsely. The prepared themes are already quite colorful (blue = structure, red = alert, green = example). If you add more colors, you should have a *very* good reason.
- Keep it simple. Typically, your audience will see a slide for less than 50 seconds. They will not have the time to puzzle through long sentences or complicated formulas.
- Prefer enumerations and itemize environments over plain text. Do not use long sentences.

## 2.6 Step Five: Test Your Presentation

You should *always* test your presentation. For this, you should vocalize or subvocalize your talk in a quiet environment. Typically, this will show that your talk is too long. You should then remove parts of the presentation, such that it fits into the allotted time slot. Do *not* attempt to talk faster in order to squeeze the talk into the given amount of time. You are almost sure to lose your audience this way.

Do not try to create the “perfect” presentation immediately. Rather, test and retest the talk and modify it as needed.

## 2.7 Step Six: Optionally Create a Handout

Once your talk is fixed, you can create a handout, if this seems appropriate. For this, use the class option `handout` as explained in Section 5.1. Typically, you might wish to put several handout slides on one page. See Section 2.4.2 on how to do this.

# 3 Frames and Overlays

A presentation consists of a series of frames. Each frame consists of a series of slides. You create a frame using the command `\frame`. This command takes one parameter, namely the contents of the frame. All of this text that is not tagged by overlay specifications is shown on all slides of the frame.

## 3.1 Frame Titles

Each frame typically has an individual frame title, which is shown prominently at the top of the frame. This title is created using the command `\frametitle`.

### Command `frametitle`

Parameters:

1. a title for the frame.

Example: `\frametitle{A Frame Title is Important.}`

## 3.2 Commands with Overlay Specifications

The number of slides in a frame is calculated automatically from the overlay specifications inside the frame, but see below for how to specify this number explicitly. The number is chosen to be the maximum number mentioned in any overlay specification. An overlay specification is a comma-separated list of slides and ranges. Ranges are specified like this: 2–5, which means slide two through to five. The start or the beginning of a range can be omitted. For example, 3– means “slides three, four, five, and so on” and –5 means the same as 1–5. A complicated example is –3,6–8,10,12–15, which selected the slides 1, 2, 3, 6, 7, 8, 10, 12, 13, 14, and 15.

Overlay specifications can be written behind certain commands. If such an overlay specification is present, the command will only “take effect” on the specified slides. What exactly “take effect” means depends on the command. Consider the following example.

```
\frame
{
  \textbf{This line is bold on all three slides.}
  \textbf<2>{This line is bold only on the second slide.}
  \textbf<3>{This line is bold only on the third slide.}
}
```

For the command `\textbf`, the overlay specification causes the text to be set in boldface only on the specified slides. On all other slides, the text is set in a normal font.

You cannot add an overlay specification to every command, but only to those listed below. However, it is quite easy to redefine a command such that it becomes “overlay specification aware.”

For the following commands, adding an overlay specification causes the command to be simply ignored on slides that are not included in the specification: `\textbf`, `\textit`, `\textsl`, `\textrm`, `\textsf`, `\color`, `\alert`, `\structure`. If a command takes several arguments, like `\color`, the specification directly follows the command as in the following example.

```
\frame
{
  \color<2-3>[rgb]{1,0,0} This text is red on slides 2 and 3, otherwise black.
}
```

For the following commands, the effect of an overlay specification is special:

### Command `\only`

Parameters:

1. a text

Description: If an overlay specification is present, the text is inserted only into the specified slides. For other slides, the text is simply thrown away. In particular, it occupies no space.

Example: `\only<3->{Text inserted from slide 3 on.}`

There exists a variant of `\only`, namely `\pgfonly`, that should be used inside PGF pictures instead of `\only`. The command `\pgfonly` inserts appropriate `\ignorespaces` commands that are needed by PGF.

### Command `\uncover`

Parameters:

1. a text

Description: If an overlay specification is present, the text is shown (“uncovered”) only on the specified slides. On other slides, the text still occupies space and it is still typeset, but it is not shown.

Example: `\uncover<3->{Text shown from slide 3 on.}`

### Command `\alt`

Parameters:

1. a slide specification in pointed brackets.
2. a main text
3. an alternative text

Description: The main text is shown on the specified slides, otherwise the alternative text. The specification must always be present.

Example: `\alt<2>{On Slide 2}{Not on slide 2.}`

### Command item

Description: Adding an overlay specification to an item in a list causes this item to be uncovered only on the specified slides. This is useful for creating lists that are uncovered piecewise. Note that you are not required to stick to an order in which items are uncovered.

Example:

```
\frame
{
  \begin{itemize}
    \item<1-> First point, shown on all slides.
    \item<2-> Second point, shown on slide 2 and later.
    \item<2-> Third point, also shown on slide 2 and later.
    \item<3-> Fourth point, shown on slide 3.
  \end{itemize}
}

\frame
{
  \begin{enumerate}
    \item<3->[0.] A zeroth point, shown at the very end.
    \item<1-> The first an main point.
    \item<2-> The second point.
  \end{enumerate}
}
```

In the following concluding example, a list is uncovered item-wise. The last uncovered item is furthermore highlighted.

```
\frame
{
  The advantages of the beamer class are
  \begin{enumerate}
    \item<1-> \alert<1>{It is easy to use.}
    \item<2-> \alert<2>{It is easy to extend.}
    \item<3-> \alert<3>{It works together with \texttt{pdflatex}.}
    \item<4-> \alert<4>{It has nice overlays.}
  \end{enumerate}
}
```

## 3.3 Environments with Overlay Specifications

Environments can also be equipped with overlay specifications. For most of the predefined environments, see subsection 4.6, adding an overlay specifications causes the whole environment to be uncovered only on the specified slides. This is useful for showing things incrementally as in the following example.

```
\frame
{
  \frametitle{A Theorem on Infinite Sets}

  \begin{theorem}<1->
```



```

    There exists an infinite set.
\end{theorem}

\begin{proof}<3->
    This follows from the axiom of infinity.
\end{proof}

\begin{example}<2->
    The set of natural numbers is infinite.
\end{example}
}

```

In the example, the first slide only contains the theorem, on the second slide an example is added, and on the third slide the proof is also shown.

The two special environments `onlyenv` and `uncoverenv` are “environment versions” of the commands `\only` and `\uncover`.

### Environment `onlyenv`

Description: If an overlay specification is given, the contents of the environment is inserted into the text only on the specified slides.

Example:

```

\frame
{
    This line is always shown.
    \begin{onlyenv}<2>
        This line is inserted on slide 2.
    \end{onlyenv}
}

```

### Environment `uncoverenv`

Description: If an overlay specification is given, the contents of the environment is shown only on the specified slides. It still occupies space on the other slides.

Example:

```

\frame
{
    This word is
    \begin{uncoverenv}<2>
        visible
    \end{uncoverenv}
    only on slide 2.
}

```

## 3.4 Restricting the Slides of a Frame

As mentioned above, the number of slides in a frame is automatically calculated. If the largest number mentioned in any specification is 4, four slides are introduced (despite the fact that a specification like `<4->` might suggest that more than four slides would be possible).

You can also specify the number of slides in the frame “by hand.” To do so, you pass an optional argument to the `\frame` command, given in *square* brackets. This argument is also a slide specification. The frame will contain only the slides specified in this argument. Consider the following example.

```
\frame[1-2,4-]
{
  This is slide number \only<1>{1}\only<2>{2}\only<3>{3}%
  \only<4>{4}\only<5>{5}.
}
```

This command will create a frame containing four slides. The first will contain the text “This is slide number 1,” the second “This is slide number 2,” the third “This is slide number 4,” and the fourth “This is slide number 5.”

### 3.5 Dynamically Changing Text

You may sometimes wish to have some part of a frame change dynamically from slide to slide. On each slide of the frame, something different should be shown inside this area. You could achieve the effect of dynamically changing text by giving a list of `\only` commands like this:

```
\only<1>{Initial text.}
\only<2>{Replaced by this on second slide.}
\only<3>{Replaced again by this on third slide.}
```

The trouble with this approach is that it may lead to slight, but annoying differences in the heights of the lines, which may cause the whole frame to “whobble” from slide to slide. This problem becomes much more severe if the replacement text is several lines long.

To solve this problem, you can use two environments: `overlayarea` and `overprint`. The first is more flexible, but less user-friendly.

#### Environment `overlayarea`

Parameters:

1. The width of the area.
2. The height of the area.

Description: Everything within the environment will be placed in a rectangular area of the specified size. The area will have the same size on all slides of a frame, regardless of its actual contents.

Example:

```
\begin{overlayarea}{\textwidth}{3cm}
  \only<1>{Some text for the first slide.\\Possibly several lines long.}
  \only<2>{Replacement on the second slide.}
\end{overlayarea}
```

#### Environment `overprint`

Parameters:

1. Optional parameter in square brackets: width of the overprint area. Default: text width.

Description: Inside the environment, use `onslide` commands to specify different things that should be shown for this environment on different slides. The `onslide` commands are used like `item` commands. Everything within the environment will be placed in a rectangular area of the specified width. The height and depth of the area are chosen large enough to accommodate the largest contents of the area. The overlay specifications of the `onslide` commands must be disjoint.

Example:

```

\begin{overprint}
  \onslide<1>
    Some text for the first slide.\\
    Possibly several lines long.
  \onslide<2>
    Replacement on the second slide.
\end{overprint}

```

### 3.6 Making Commands and Environments Overlay-Specification-Aware

You can define a new command that is overlay-specification-aware using the following command.

#### Command `newoverlaycommand`

Parameters:

1. name of the command
2. commands to be executed on the specified slides
3. commands to be executed otherwise

Description: Declares a new command. If this command is encountered, it is checked whether an overlay specification follows. If not, the commands given in the second parameter are executed. If there is a specification, the second parameter is executed if the current slide is specified, otherwise the third parameter is executed.

Example:

```

\newoverlaycommand{\SelectRedAsColor}{\color[rgb]{1,0,0}}{}
...
\frame
{
  \SelectRedAsColor<2>
  The second slide of this frame is all in red.
}

```

#### Command `renewoverlaycommand`

Parameters:

1. name of a command to be redefined
2. commands to be executed on the specified slides
3. commands to be executed otherwise

Description: Reddeclares a command that already exists in the same way as `newoverlaycommand`. Inside the parameters, you can still access to original definitions using the command `original`, see the example.

Example:

```

\renewoverlaycommand{\tiny}{\original{\tiny}}{}
...
\frame
{
  \tiny<2>This text is tiny on slide 2.
}

```

#### Command `newoverlayenvironment`

Parameters:

1. name of the environment
2. begin commands to be executed on the specified slides
3. end commands to be executed on the specified slides
4. begin commands to be executed otherwise
5. end commands to be executed otherwise

Description: Declares a new environment that is overlay specification aware. If this environment encountered, it is checked whether an overlay specification follows. If not or if it is found and the current slide is specified, the second and third parameters form the beginning and end of the environment. Otherwise, the fourth and fifth parameters are used.

This command can take one optional parameter, given in square brackets after the first parameter. If this parameter is specified, it must currently be 1. In this case, the begin commands must take one parameter. This parameter will *precede* the overlay specification, see the examples.

Example:

```
\newoverlayenvironment{mytheorem}{\alert{Theorem}:}{\Theorem:}{}

\frame
{
  \begin{mytheorem}<2>
    This theorem is highlighted on the second slide.
  \end{mytheorem}
}

\newoverlayenvironment{mytheorem}[1]{\alert{Theorem #1}:}{\Theorem #1:}{}

\frame
{
  \begin{mytheorem}{of Tantau}<2>
    This theorem is highlighted on the second slide.
  \end{mytheorem}
}
```

### 3.7 Frames and Verbatim Commands

The `\verb` command and the verbatim environment work only in frames that contain a single slide. Furthermore, you must explicitly specify that the frame contains only one slide; like this:

```
\frame[all:1]
{
  \frametitle{Our Search Procedure}

  \begin{verbatim}
int find(int* a, int n, int x)
{
  for (int i = 0; i<n; i++)
    if (a[i] == x)
      return i;
}
  \end{verbatim}
}
```

Instead of `\frame[all:1]` you could also have specified `\frame[1]`, but this works only for the presentation version of the talk, not for the handout version. To make verbatim accessible also in the handout version, you would have to specify `\frame[1| handout: 1]` and even more if you also have a transparencies version. The specification `\frame[all:1]` states that the frame has just one slide in all versions.

If you need to use verbatim commands in frames that contain several slides, you must *declare* your verbatim texts before the frame starts. This is done using two special commands:

### Command `\defverb`

Parameters:

1. command name (including a backslash)
2. a one-line verbatim text, delimited by a special symbol (works like the `\verb` command). Adding a star before the second parameter make spaces visible.

Description: Declares a verbatim text for later use. The declaration should be done outside the frame. Once declared, the text can be used in overlays like normal text.

Example:

```
\defverb\mytext!int main (void) { ...!
\defverb\mytextspaces*!int main (void ){ ...!

\frame
{
  \begin{itemize}
  \item<1-> In C you need a main function.
  \item<2-> It is declare like this: \mytext
  \item<3-> Spaces are not important: \mytextspaces
  \end{itemize}
}
```

### Command `\defverbatim`

Parameters:

1. command name (including a backslash)
2. a normal parameter that contains a `verbatim` or `verbatim*` environment.

Description: Declares a verbatim environment for later use. The declaration should be done outside the frame. Once declared, the text can be used in overlays like normal text.

Example:

```
\defverbatim\algorithm{
\begin{verbatim}
int main (void)
{
  cout << "Hello world." << endl;
  return 0;
}
\end{verbatim}}

\frame
{
  Our algorithm:

  \alert<1>{\algorithm}

  \uncover<2>{Note the return value.}
}
```

## 4 Structurizing the Text

### 4.1 Lists

There are two predefined environments for creating lists, namely `enumerate` and `itemize`. These can be nested to depth two, but not further (this would create totally unreadable slides).

The `\item` command is overlay-specification-aware. If an overlay specification is provided, the item will only be shown on the specified slides, see the following example.

```
\frame
{
  There are three important points:
  \begin{enumerate}
    \item<1-> A first one,
    \item<2-> a second one with a bunch of subpoints,
      \begin{itemize}
        \item first subpoint.
        \item<3-> second subpoint added on third slide.
        \item<4-> third subpoint added on fourth slide.
      \end{itemize}
    \item<5-> and a third one.
  \end{enumerate}
}
```

### 4.2 Sections and Subsections

You can structurize your text using the commands `\section` and `\subsection`. Unlike standard  $\text{\LaTeX}$ , these commands will not create a heading at the position where you use them. Rather, they will add an entry to the table of contents and also to the navigation bars.

In order to create a line break in the table of contents (usually not a good idea), you can use the command `\breakhere`. Note that the standard command `\\` does not work.

#### Command `\section`

Parameters:

1. (optional, in square brackets) text to be shown in horizontal navigation bars
2. text to be shown in the table of contents; if empty, no entry is created.

Description: Starts a section. No heading is created, the section name is only shown in the table of contents and in the navigation bar. If the main parameter is empty, but the parameter in square brackets is not, a navigation entry is created, but no entry in the table of contents. This is useful for sections like a “table of contents section.”

Example: `\section[Summary]{Summary of Main Results}` or `\section[Outline]{}{}`

#### Command `\subsection`

Parameters:

1. text to be shown in the table of contents and in the navigation bar.

Description: Starts a subsection. No heading is created, the subsection name is only shown in the table of contents and in the navigation bar.

Example: `\subsection{Some Subsection}`

### 4.3 Table of Contents

The two commands for creating a table of contents are `\tableofcontents` and `\tableofcontentscurrent`. The difference between these commands is small: the first inserts the main table of contents into the current frame, the second inserts a table of contents in which only the current section is highlighted. An example usage is given in the following example:

```
\section[Outline]{}
\frame{\tableofcontents}

\section{Introduction}
\frame{\tableofcontentscurrent}
\subsection{Why?}
\frame{...}
\frame{...}
\subsection{Where?}
\frame{...}

\section{Results}
\frame{\tableofcontentscurrent}
\subsection{Because}
\frame{...}
\subsection{Here}
\frame{...}
```

### 4.4 Title Page

You can use the `\titlepage` command to insert a title page into a frame.

The `\titlepage` command will arrange the following elements on the title page: the document title, the author(s)'s names, their affiliation, a title graphic, and a date. Before you invoke the title page command, you must specify all elements you wish to be shown. This is done using the following commands:

#### Command title

Parameters:

1. A title for the document. Line breaks can be inserted using the double-backslash command.

Example: `\title{The Beamer Class}`

#### Command author

Parameters:

1. Names of the authors.

Description: The names should be separated using the command `and`. In case authors have different affiliations, they should be suffixed by the command `inst` with different parameters.

Example: `\author{Lane Hemaspaandra\inst{1} \and Till Tantau\inst{2}}`

#### Command institute

Parameters:

1. Institute(s) where the authors work.

Description: If more than one institute is given, they should be separated using the command `and` and they should be prefixed by the command `inst` with different parameters.

Example:

```
\institute{
  \inst{1}Department of Computer Science\\
  University of Rochester
  \and
  \inst{2}Fakult\"at f\"ur Elektrotechnik und Informatik\\
  Technical University of Berlin}
```

### Command `date`

Parameters:

1. A text to be shown as date or occasion at which the talk was held.

Example: `\date{\today}` or `\date{STACS Conference, 2003}`.

### Command `titlegraphic`

Parameters:

1. A text to be shown as title graphic. Typically, a picture environment is used as text.

Example: `\titlegraphic{\pgfuseimage{titlegraphic}}`

## 4.5 Columns

Three environments are used to create columns on a slide. Columns are especially useful for placing a graphic next to a description/explanation. The main environment for creating columns is called `columns`. Inside this environment, you can place several `column` environments. Each will create a new column.

### Environment `columns`

Description: A multi-column area. Inside the environment you should place only `column` environments.

Example:

```
\begin{columns}
  \begin{column}{5cm}
    First column.
  \end{column}
  \begin{column}{5cm}
    Second column.
  \end{column}
\end{columns}
```

### Environment `columnsonlytextwidth`

Description: This command has the same effect as `columns`, except that the columns will not occupy the whole page width, but only the text width.

### Environment `column`

Parameters:

1. The width of the column.

Description: Creates a single column of the specified width. The column is centered vertically relative to the other columns.



## 4.6 Predefined Environments and Commands

The BEAMER class predefines a number of useful environments and commands. Using these commands makes it easy to change the appearance of a document by changing the theme.

### Command `alert`

Parameters:

1. a text to be highlighted.

Description: The given text is highlighted, typically by coloring the text red. If an overlay specification is given, the command only has an effect on the specified slides.

Example: This is `\alert{important}`.

### Command `structure`

Parameters:

1. a text to be marked as part of the structure of the text.

Description: The given text is marked as part of the structure, typically by coloring the text in the structure color. If an overlay specification is given, the command only has an effect on the specified slides.

Example: `\structure{Paragraph Heading.}`

### Environment `block`

Parameters:

1. a block title

Description: Inserts a block, like a definition or a theorem, with a title. If an overlay specification is given, the block is shown only on the specified slides. In the example, the definition is shown only from slide 3 onwards.

Example:

```
\begin{block}{Definition}<3->
  A \alert{set} consists of elements.
\end{block}
```

### Environment `alertblock`

Parameters:

1. a block title

Description: Inserts a block whose title is highlighted. If an overlay specification is given, the block is shown only on the specified slides.

Example:

```
\begin{alertblock}{Wrong Theorem}
  $1=2$.
\end{alertblock}
```

### Environment `exampleblock`

Parameters:

1. a block title

Description: Inserts a block that is supposed to be an example. If an overlay specification is given, the block is shown only on the specified slides.

Example:

```
\begin{exampleblock}{Example}
  The set  $\{1,2,3,5\}$  has four elements.
\end{exampleblock}
```

Predefined English block environments, that is, block environments with fixed title, are: **Theorem**, **Proof**, **Corollary**, **Fact**, **Example**, and **Examples**. You can also use these environments with a lowercase first letter, the result is the same. The following German block environments are also predefined: **Problem**, **Loesung**, **Definition**, **Satz**, **Beweis**, **Folgerung**, **Lemma**, **Fakt**, **Beispiel**, and **Beispiele**. See the following example for their usage

```
\frame
{
  \frametitle{A Theorem on Infinite Sets}

  \begin{theorem}<1->
    There exists an infinite set.
  \end{theorem}

  \begin{proof}<2->
    This follows from the axiom of infinity.
  \end{proof}

  \begin{example}<3->
    The set of natural numbers is infinite.
  \end{example}
}
```

## 5 Creating Handouts, Transparencies, and Notes

The **beamer** package offers different ways of creating special versions of your talk that can be used in different contexts. You can easily create a *handout* version of the presentation that can be distributed to the audience. You can also create a version that is more suitable for a presentation using an overhead projector. Finally, you can add notes for yourself that help you remember what to say for specific slides. All of these versions coexist in your main file. They are created by specifying different class options and rerunning T<sub>E</sub>X on the main file.

### 5.1 Creating Handouts

A *handout* is a version of a presentation that is printed on paper and handed out to the audience before or after the talk. (See Section 2.4.2 for how to place numerous frames on one pages, which is very useful for handouts.) For the handout you typically want to produce as few slides as possible per frame. In particular, you do not want to print a new slide for each slide of a frame. Rather, only the “last” slide should be printed.

In order to create a handout, specify the class option **handout**. If you do not specify anything else, this will cause all overlay specifications to be suppressed. For most cases this will create exactly the desired result.

In some cases, you may want a more complex behaviour. For example, if you use many **\only** commands to draw an animation. In this case, suppressing all overlay specifications is not such a good idea, since this will cause all steps of the animation to be shown at the same time. In some cases this is not desirable. Also, it might be desirable to suppress some **\alert** commands that apply only to specific slides in the handout.

For a fine-grained control of what is shown on a handout, you can use *alternate overlay specifications*. They specify which slides of a frame should be shown for a special version, for example for the handout

version. An alternate overlay specification is written alongside the normal overlay specification inside the pointed brackets. It is separated from the normal specification by a vertical bar and a space. The version to which the alternate specification applies is written first, followed by a colon. Here is an example:

```
\only<1-3,5-9| handout:2-3,5>{Text}
```

This specification says: “Normally, insert the text on slides 1–3 and 5–9. For the handout version, insert the text only on slides 2, 3, and 5.” If no alternate overlay specification is given for handouts, the default is “always.” This causes the desirable effect that if you do not specify anything, the overlay specification is effectively suppressed for the handout.

An especially useful specification is the following:

```
\only<3| handout:0>{Not shown on handout.}
```

Since there is no zeroth slide, the text is not shown. Likewise, `\alert<3| handout:0>{Text}` will not alert the text on a handout.

You can also use an alternate overlay specification for the optional argument of the `frame` command as in the following example.

```
\frame[1-| handout:0]{Text...}
```

This causes the frame to be suppressed in the handout version. Also, you can restrict the presentation such that only specific slides of the frame are shown on the handout:

```
\frame[1-| handout:4-5]{Text...}
```

It is also possible to give only an alternate overlay specification. For example, `\alert<handout:0>{...}` causes the text to be always highlighted during the presentation, but never on the handout version. Likewise, `\frame[handout:0]{...}` causes the frame to be suppressed for the handout.

Finally, note that it is possible to give more than one alternate overlay specification and in any order. For example, the following specification states that the text should be inserted on the first three slides in the presentation, in the first two slides of the transparency version, and not at all in the handout.

```
\only<trans:1-2| 1-3| handout:0>{Text}
```

If you wish to give the same specification in all versions, you can do so by specifying `all:` as the version. For example,

```
\frame[all:1-2]
{
  blah...
}
```

ensures that the frame has two slides in all versions.

## 5.2 Creating Transparencies

The main aim of the beamer class is to create presentations for beamers. However, it is often useful to print transparencies as backup, in case the hardware fails. A transparencies version of a talk often has less slides than the main version, since it takes more time to switch slides, but it may have more slides than the handout version. For example, while in a handout an animation might be condensed to a single slide, you might wish to print several slides for the transparency version.

You can use the same mechanism as for creating handouts: Specify `trans` as a class option and add alternate transparency specifications for the `trans` version as needed. An elaborated example of different overlay specifications for the presentation, the handout, and the transparencies can be found in the file `beamerexample.tex`.

## 5.3 Adding Notes

You can add notes to your slides using the command `\note`. A note is a reminder to yourself of what you should say or should keep in mind when presenting a frame. The `\note` command should be given after the frame to which the note applies. Here is a typical example.

```
\frame{
  \begin{itemize}
    \item<1-> Eggs
    \item<2-> Plants
    \item<3-> Animals
  \end{itemize}
}
\note{Tell joke about eggs.}
```

The note command will create a new page that contains your text plus some information that should make it easier to match the note to the frame while talking.

Since you normally do not wish the notes to be part of your presentation, you must explicitly specify the class option `notes` to include notes. If this option is not specified, notes are suppressed. If you specify `notesonly` instead of `notes`, only notes will be included and all normal frames are parsed, but not displayed. This is useful for printing the notes.

### Command `note`

Parameters:

1. a note text.

Description: Creates a note page. Should be given right after a frame.

Example: `\note{Talk no more than 1 minute.}`

### Command `noteitems`

Parameters:

1. a list of `item` commands.

Description: Just like the `note` command, except that an `itemize` environment is setup inside the note.

Example:

```
\frame{Bla bla...}
\noteitems{
  \item Stress the importance.
  \item Use no more than 2 minutes.
}
```

## 6 Customization

### 6.1 Margins and Sizes

The “paper size” of a beamer presentation is fixed to 128mm times 96mm. The aspect ratio of this size is 4:3, which is exactly what most beamers offer this days. It is the job of the presentation program (like `acroread`) to display the slides at full screen size. The main advantage of using a small “paper size” is that you can use all your normal fonts at their natural sizes. In particular, inserting a graphic with 11pt labels will result in reasonably sized labels during the presentation.

You should refrain from changing the “paper size.” However, you *can* change the size of the left and right margins, which default to 1cm. To change them, use the command `\geometry`. For example, to set the left margin to 0.5cm and the right margin to 0.25cm, use

`\geometry{left=0.5cm,right=0.25cm}`

somewhere in the preamble. You can also specify the margins differently, see the documentation of the `geometry` package for details on the different ways.

## 6.2 Class Options

Class options are listed right behind the command `\documentclass` in square brackets. Class options, see the following list, govern certain global behaviors of the presentation.

### **Class Option** `notes`

Description: Include notes in the output file. Normally, notes are not included.

### **Class Option** `notesonly`

Description: Include only the notes in the output file. Useful for printing them.

### **Class Option** `handout`

Description: Create a version that uses the `handout` overlay specifications. See subsection 5.1.

### **Class Option** `trans`

Description: Create a version that uses the `trans` overlay specifications. See subsection 5.2.

### **Class Option** `hidesubsections`

Description: Suppresses the subsections in the main table of contents. This is useful if you do not wish to show too many details when presenting the talk outline. However, the subsections of the current subsection will still be shown when using the command `tableofcontentscurrent`.

### **Class Option** `shadesubsections`

Description: Show the subsections in the main table of contents in a shaded way. This is useful if you wish to show, but do not wish to talk about them when presenting the talk outline.

### **Class Option** `inrow`

Description: All small frame representation in the navigation bars for a single section are shown alongside each other. Normally, the representation for different subsections are shown in different lines.

### **Class Option** `blue`, `red`, `grey`, `brown`

Description: These options change the main color of the navigation and title bars to the given colors. Other colors can be setup using the command `themecolor`, which takes three parameters: a red, a green, and a blue value as floating point numbers between 0 (black) and 1 (highest intensity).

## 6.3 Themes

Just like  $\text{\LaTeX}$  in general, the `beamer` class tries to separate the contents of a text from the way it is typeset (displayed). There are two ways in which you can change how a presentation is typeset: you can specify a different theme and you can specify different templates. A theme is a predefined collection of templates.

There exist a number of different predefined themes that can be used together with the `beamer` class. Feel free to add further themes. Themes are used by including an appropriate  $\text{\LaTeX}$  style file, using the standard `\usepackage` command.

## Theme beamerthemebars

Example:

Outline	Our Model	Power of the Model	Limitations of the Model	Summary
	oo oooo	oo ooooo ooo	ooo	

Computation with Absolutely No Space Overhead

Lane Hemaspaandra<sup>1</sup> Proshanto Mukherji<sup>1</sup> Till Tantau<sup>2</sup>

<sup>1</sup>Department of Computer Science  
University of Rochester

<sup>2</sup>Fakultät für Elektrotechnik und Informatik  
Technical University of Berlin

Developments in Language Theory Conference, 2003

The Model of Overhead-Free Computation  
The Standard Model of Linear Space  
Our Model of Absolutely No Space Overhead

The Power of Overhead-Free Computation  
Palindromes  
Linear Languages  
Context-Free Languages with a Forbidden Subword  
Languages Complete for Polynomial Space

Limitations of Overhead-Free Computation  
Linear Space is Strictly More Powerful

Lane Hemaspaandra, Proshanto Mukherji, Till Tantau  
Computation with Absolutely No Space Overhead

## Theme beamerthemeclassic

Example:

Outline	Our Model	Power of the Model	Limitations of the Model	Summary
	oo oooo	oo ooooo ooo	ooo	

*Computation with Absolutely No Space Overhead*

Lane Hemaspaandra<sup>1</sup> Proshanto Mukherji<sup>1</sup> Till Tantau<sup>2</sup>

<sup>1</sup>Department of Computer Science  
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Palindromes  
Linear Languages  
Context-Free Languages with a Forbidden Subword  
Languages Complete for Polynomial Space

*Limitations of Overhead-Free Computation*  
Linear Space is Strictly More Powerful

Lane Hemaspaandra, Proshanto Mukherji, Till Tantau  
Computation with Absolutely No Space Overhead

## Theme beamerthemelined

Example:

Outline	Our Model	Power of the Model	Limitations of the Model	Summary
	oo oooo	oo ooooo ooo	ooo	

Computation with Absolutely No Space Overhead

Lane Hemaspaandra<sup>1</sup> Proshanto Mukherji<sup>1</sup> Till Tantau<sup>2</sup>

<sup>1</sup>Department of Computer Science  
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Developments in Language Theory Conference, 2003

The Model of Overhead-Free Computation  
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Languages Complete for Polynomial Space

Limitations of Overhead-Free Computation  
Linear Space is Strictly More Powerful

Lane Hemaspaandra, Proshanto Mukherji, Till Tantau: Computation with Absolutely No Space Overhead

## Theme beamerthemeplain

Example:

### Computation with Absolutely No Space Overhead

Lane Hemaspaandra<sup>1</sup> Proshanto Mukherji<sup>1</sup> Till Tantau<sup>2</sup>

<sup>1</sup>Department of Computer Science  
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Technical University of Berlin

Developments in Language Theory Conference, 2003

### The Model of Overhead-Free Computation

The Standard Model of Linear Space  
Our Model of Absolutely No Space Overhead

### The Power of Overhead-Free Computation

Palindromes  
Linear Languages  
Context-Free Languages with a Forbidden Subword  
Languages Complete for Polynomial Space

### Limitations of Overhead-Free Computation

Linear Space is Strictly More Powerful

## Theme beamerthemesplit

Example:



### Computation with Absolutely No Space Overhead

Lane Hemaspaandra<sup>1</sup> Proshanto Mukherji<sup>1</sup> Till Tantau<sup>2</sup>

<sup>1</sup>Department of Computer Science  
University of Rochester

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Technical University of Berlin

Developments in Language Theory Conference, 2003

### The Model of Overhead-Free Computation

The Standard Model of Linear Space  
Our Model of Absolutely No Space Overhead

### The Power of Overhead-Free Computation

Palindromes  
Linear Languages  
Context-Free Languages with a Forbidden Subword  
Languages Complete for Polynomial Space

### Limitations of Overhead-Free Computation

Linear Space is Strictly More Powerful



## Theme beamerthemetree

Example:



### Computation with Absolutely No Space Overhead

Lane Hemaspaandra<sup>1</sup> Proshanto Mukherji<sup>1</sup> Till Tantau<sup>2</sup>

<sup>1</sup>Department of Computer Science  
University of Rochester

<sup>2</sup>Fakultät für Elektrotechnik und Informatik  
Technical University of Berlin

Developments in Language Theory Conference, 2003

### The Model of Overhead-Free Computation

The Standard Model of Linear Space  
Our Model of Absolutely No Space Overhead

### The Power of Overhead-Free Computation

Palindromes  
Linear Languages  
Context-Free Languages with a Forbidden Subword  
Languages Complete for Polynomial Space

### Limitations of Overhead-Free Computation

Linear Space is Strictly More Powerful

## Theme beamerthemetreebars

Example:



## 6.4 Templates

If you only wish to modify a small part of how your presentation is rendered, you do not need to create a whole new theme. Instead, you can modify an appropriate template.

A template specifies how a part of a presentation is typeset. For example, the frame title template dictates where the frame title is put, which font is used, and so on.

As the name suggests, you specify a template by writing the exact  $\text{\LaTeX}$  code you would also use when typesetting a single frame title by hand. Only, instead of the actual title, you use the command `\insertframetitle`.

For example, suppose we would like to have the frame title typeset in red, centered, and boldface. If we were to typeset a single frame title by hand, it might be done like this:

```
\frame
{
  \begin{centering}
    \color{red}
    \textbf{The Title of This Frame.}
  \par
  \end{centering}

  Blah, blah.
}
```

In order to typeset the frame title in this way on all slides, we can change the frame title template as follows:

```
\useframetitletemplate{
  \begin{centering}
    \color{red}
    \textbf{\insertframetitle}
  \par
  \end{centering}
}
```

We can then use the following code to get the desired effect:

```
\frame
{
  \frametitle{The Title of This Frame.}
```



```
    Blah, blah.  
}
```

When rendering the frame, the beamer class will use the code of the frame title template to typeset the frame title and it will replace every occurrence of `\insertframetitle` by the current frame title.

In the next subsection predefined commands are listed that change one or more templates. In the two subsequent subsection, complete listings of all templates are given and the different `\insertxxxx` commands are explained.

#### 6.4.1 Predefined Templates: Backgrounds

Just as there exist predefined themes, there exist predefined templates. They are defined in the package `beamertemplates`. Calling one of the following commands will change a template in a predefined way. Using them, you can use, for example, your favorite theme together with a predefined background.

##### Command `beamertemplateshadingbackground`

Parameters:

1. A comma-separated rgb triple specifying the color at the page bottom.
2. A comma-separated rgb triple specifying the color at the top of the page.

Description: Installs a vertically shaded background such that the specified bottom color changes smoothly to the specified top color. **Use with care: Background shadings are often distracting!** However, a very light shading with warm colors can make a presentation more lively.

Example:

```
\beamertemplateshadingbackground{1,0.9,0.9}{0.9,0.9,1}  
% Bottom is light red, top is light blue
```

##### Command `beamertemplategridbackground`

Description: Installs a light grid as background.

#### 6.4.2 Predefined Templates: Head and Foot Lines

##### Command `beamertemplateheadempty`

Description: Makes the head line empty.

##### Command `beamertemplatefootempty`

Description: Makes the foot line empty.

##### Command `beamertemplatefootpagenumber`

Description: Shows only the page number in the foot line.

#### 6.4.3 Predefined Templates: Itemizing

##### Command `beamertemplatedotitem`

Description: Changes the symbols shown in an `itemize` environment to dots.

##### Command `beamertemplateballitem`

Description: Changes the symbols shown in an `itemize` environment to small plastic balls.

#### 6.4.4 Predefined Templates: Navigation Bars

##### Command `beamertemplateboxminiframe`

Description: Changes the symbols in a navigation bar used to represent a frame to a small box.

##### Command `beamertemplateeticksminiframe`

Description: Changes the symbols in a navigation bar used to represent a frame to a small vertical bar of varying length.

#### 6.4.5 Changing Templates

In the following, all commands that change a template are listed. Inside these commands, you should use the `\insertxxxx` commands listed in the next subsection.

##### Command `usetitlepagetemplate`

Parameters:

1. a template for the title page

Example:

```
\usetitlepagetemplate{
  \vbox{}
  \vfill
  \begin{centering}
    \Large\structure{\inserttitletitle}
    \vskip1em\par
    \normalsize\insertauthortitle\vskip1em\par
    {\scriptsize\insertinstitute\par}\par\vskip1em
    \insertdate\par\vskip1.5em
    \inserttitlegraphic
  \end{centering}
  \vfill
}
```

##### Command `useframetitletemplate`

Parameters:

1. a template for the frame title

Example:

```
\useframetitletemplate{%
  \begin{centering}
    \structure{\textbf{\insertframetitle}}
  \par
  \end{centering}
}
```

##### Command `usealerttemplate`

Parameters:

1. a template for the `alert` command

Example: `\usealerttemplate{{\color{red}\insertalert}}`

#### **Command usestructuretemplate**

Parameters:

1. a template for the `structure` command

Example: `\usestructuretemplate{{\color{structure}\insertstructure}}`

#### **Command usebackgroundtemplate**

Parameters:

1. a template for the page background

Example:

```
\usebackgroundtemplate{%  
  \color{red}%  
  \vrule height\paperheight width\paperwidth%  
}
```

#### **Command usefoottemplate**

Parameters:

1. a template for the foot line

Example:

```
\usefoottemplate{\hfil\tiny{\color{shaded}\insertpagenumber}}
```

#### **Command useheadtemplate**

Parameters:

1. a template for the head line

Example:

```
\useheadtemplate{%  
  \vbox{%  
    \vskip3pt%  
    \line{\insertnavigation{\paperwidth}}%  
    \vskip1.5pt%  
    \insertvrule{0.4pt}{structureshaded}}%  
}
```

#### **Command usesectionheadtemplate**

Parameters:

1. a template for the current section name in a head line.
2. a template for a different section name in a head line.

Example:

```
\usesectionheadtemplate
{\color{structure}\tiny\insertsectionhead}
{\color{structureshaded}\tiny\insertsectionhead}
```

### **Command** `usetemplatetocsection`

Parameters:

1. a template for a section name in the table of contents.
2. a template for a grayed section name in the table of contents.

Example:

```
\usetemplatetocsection
{\color{structure}\inserttocsection}
{\color{structureshaded}\inserttocsection}
```

### **Command** `usesubsectionheadtemplate`

Parameters:

1. a template for the current subsection name in a head line.
2. a template for a different subsection name in a head line.

Example:

```
\usesubsectionheadtemplate
{\color{structure}\tiny\insertsubsectionhead}
{\color{structureshaded}\tiny\insertsubsectionhead}
```

### **Command** `usetemplatetocsubsection`

Parameters:

1. a template for a subsection name in the table of contents.
2. a template for a grayed subsection name in the table of contents.

Example:

```
\usetemplatetocsubsection
{\leavevmode\leftskip=1.5em\color{black}\inserttocsubsection\par}
{\leavevmode\leftskip=1.5em\color{shaded}\inserttocsubsection\par}
```

### **Command** `useminislidetemplate`

Parameters:

1. a template for the mini frame of the current frame in a head line.
2. a template for the mini frame of a frame of the current subsection in a head line.
3. a template for the mini frame of other frames in a head line.
4. horizontal offset between mini frames.
5. vertical offset between mini frames.

Example:

```

\useminislidetemplate
{
  \color{structure}%
  \hskip-0.4pt\vrule height\boxsize width1.2pt%
}
{%
  \color{structure}%
  \vrule height\boxsize width0.4pt%
}
{%
  \color{structureshaded}%
  \vrule height\boxsize width0.4pt%
}
{.1cm}
{.05cm}

```

### Command useblocktemplate

Parameters:

1. a template for the beginning of the block.
2. a template for the end of the block.

Example:

```

\useblocktemplate
{%
  \medskip%
  {\color{blockstructure}\textbf{\insertblockname}}%
  \par%
}
{\medskip}

```

### Command usealertblocktemplate

Parameters:

1. a template for the beginning of the block.
2. a template for the end of the block.

Example:

```

\usealertblocktemplate
{%
  \medskip
  {\alert{\textbf{\insertblockname}}}%
  \par}
{\medskip}

```

### Command useexampleblocktemplate

Parameters:

1. a template for the beginning of the block.
2. a template for the end of the block.

Example:

```
\useexampleblocktemplate
{
  \medskip
  \begingroup\color{darkgreen}{\textbf{\insertblockname}}
  \par
}
{
  \endgroup
  \medskip
}
```

### **Command useenumerateitemtemplate**

Parameters:

1. a template for the default item in the top level of an enumeration.

Example: `\useenumerateitemtemplate{\insertenumlabel}`

### **Command usesubenumerateitemtemplate**

Parameters:

1. a template for the default item in the second level of an enumeration.

Example: `\usesubenumerateitemtemplate{\insertenumlabel-\insertsubenumlabel}`

### **Command useitemizeitemtemplate**

Parameters:

1. a template for the default item in the top level of an itemize list.

Example: `\useitemizeitemtemplate{\pgfuseimage{mybullet}}`

### **Command usesubitemizeitemtemplate**

Parameters:

1. a template for the default item in the second level of an itemize list.

Example: `\usesubitemizeitemtemplate{\pgfuseimage{mysubbullet}}`

### **Command useenumeratetemplate**

Parameters:

1. a template for the beginning a top-level enumeration.
2. a template for the end of a top-level enumeration.

Example: `\useenumeratetemplate{}{}`

### **Command usesubenumeratetemplate**

Parameters:

1. a template for the beginning a second-level enumeration.
2. a template for the end of a second-level enumeration.

Example: `\usesubenumeratetemplate{\begin{small}}{\end{small}}`

**Command `useitemizetemplate`**

Parameters:

1. a template for the beginning a top-level itemize list.
2. a template for the end of a top-level itemize list.

Example: `\useitemizetemplate{}{}`

**Command `usesubitemizetemplate`**

Parameters:

1. a template for the beginning a second-level itemize list.
2. a template for the end of a second-level itemize list.

Example: `\usesubitemizetemplate{\begin{small}}{\end{small}}`

#### **6.4.6 Templates Inserts**

In the following, the different `\insertxxxx` commands are listed, which can be used inside templates.

**Command `inserttitle`**

Description: Inserts the one-line version of the document title into a template.

**Command `inserttitletitle`**

Description: Inserts a version of the document title into a template that is useful for the title page.

**Command `insertdate`**

Description: Inserts the date into a template.

**Command `insertauthor`**

Description: Inserts the one-line version of the author names into a template.

**Command `insertauthortitle`**

Description: Inserts a version of the author names into a template that is useful for the title page.

**Command `inserttitlegraphic`**

Description: Inserts the title graphic into a template.

**Command `insertinstitute`**

Description: Inserts the institute into a template.

**Command `insertinstituteshort`**

Description: Inserts the short version of the institute into a template.

**Command `insertlogo`**

Description: Inserts the logo(s) into a template.

**Command `insertsection`**

Description: Inserts the current section into a template.

**Command inserttocsection**

Description: Inserts the version of the current section name into a template that is useful for the table of contents.

**Command insertsubsection**

Description: Inserts the current subsection into a template.

**Command inserttocsubsection**

Description: Inserts the version of the current subsection name into a template that is useful for the table of contents.

**Command insertframetitle**

Description: Inserts the current frame title into a template.

**Command insertalert**

Description: Inserts the current alerted text into a template.

**Command insertstructure**

Description: Inserts the current structure text into a template.

**Command insertblockname**

Description: Inserts the name of the current block into a template.

**Command insertpagenumber**

Description: Inserts the current page number into a template.

**Command insertvrule**

Parameters:

1. a color
2. a thickness

Description: Inserts a rule of the given color and thickness into a template.

**Command insertnavigation**

Parameters:

1. a width

Description: Inserts a horizontal navigation bar of the given width into a template. The bar lists the sections and below them mini frames for each frame in that section.

**Command insertsectionnavigation**

Parameters:

1. a width

Description: Inserts a vertical navigation bar containing all sections, with the current section highlighted.

**Command insertsubsectionnavigation**

Parameters:



1. a width

Description: Inserts a vertical navigation bar containing all subsections of the current section, with the current subsection highlighted.

**Command** `insertenumlabel`

Description: Inserts the current number of the top-level enumeration (as an Arabic number) into a template.

**Command** `insertsubenumlabel`

Description: Inserts the current number of the second-level enumeration (as an Arabic number) into a template.