

The beamer Class: a L^AT_EX Presentation System

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 - `\pause`
 - `\only`
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The beamer Document Class

The beamer class was written by Till Tantau beginning in 2003. A beamer file begins with `\documentclass[options]{beamer}`. Some Options:

- `t`, `b`, `c` (default) preferred is `t`
- `handout` Sets options to be suitable for handouts
- `draft`
- `10pt`, `11pt`(default), `12pt`, and additional sizes but they require the `extsize` package

To eliminate the navigation bar, issue the command `\setbeamertemplate{navigation symbols}{}.`

Options for Automatically Loaded Packages

Beamer automatically loads the `amsmath`, `amsthm`, `array`, `enumerate`, `hyperref`, `xcolor` packages and perhaps others. The user may load additional packages but with caution. Load them only as needed! Options for the automatically loaded packages are entered as options for the `\documentclass` command. For example to load the `table` option for the `xcolor` package, type `\documentclass[xcolor=table]{beamer}`.

Other Preamble Items

These items are needed to create a title page.

- `\title[short title]{title}`. The short title is used elsewhere.
- `\subtitle{subtitle}`
- `\author[short_name(s)]{author 1_name\inst{1} \and author 2 name\inst{2}}`.
- `\institute{\inst{1}author 1 address \and\inst{2}author 2 address}`.
- `\date{desired date}`.

If no date is entered, the current date is automatically entered.
If no date is wanted, type `\date{}`.

A Simple Preamble with One Author

```
\documentclass[t]{beamer}
\title[The \texttt{beamer} Class]
{The \texttt{beamer} Class: a \LaTeX\ Presentation System}
\author[Clifford E. Weil]{Clifford E. Weil\inst{1}}
\institute{\inst{1} Department of Mathematics\\
Michigan State University\\
East Lansing, MI USA}
\date{June 16, 2010}
\begin{document}
```

A Simple Preamble with Two Authors

```
\title[The \texttt{beamer} Class]
{The \texttt{beamer} Class: a \LaTeX\ Presentation System}
\author[C. E. Weil and L. Larson]{Clifford E. Weil\inst{1}
\and Lee Larson\inst{2}}
\institute{\inst{1}Department of Mathematics\\
Michigan State University\\
East Lansing, MI USA\\
\url{weil@math.msu.edu}\\
\inst{2}Department of Mathematics\\
University of Louisville\\
Louisville, KY}
\date{June 16, 2010}
\begin{document}
```

Some beamer Terminology

- ❶ frame: an environment
- ❷ slide: the output of a *frame* environment
- ❸ overlay specifications: determine how many slides from one *frame* environment
- ❹ themes: different formats for slides

The frame Environment

The material to be covered in a beamer presentation is contained in “frames”. Frames are environments that contain text and standard L^AT_EX structures; text, commands and environments. Care must be taken not to put too much material into a single frame. `\begin{frame}<overlay specifications>[options]{Frame Title}` begins a frame. Options:

- `allowframebreaks`
- `allowdisplaybreaks`
- `b`, `t`, `c` (default)
- `fragile` (=singleslide)
- `label=<name for frame>`
- `plain`
- `squeeze`
- `shrink` (=minimum shrinkage percent)

`\end{frame}` ends the frame.

Title Page

With the information in the arguments of `\title`, `\author`, `\institute`, and `\date` the title page is created by typing

```
\begin{frame}{}  
\titlepage  
\end{frame}
```

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The Table of Contents

The divisions listed in the table of contents are the same as those for the `article` class. The user must insert `\section` commands etc. outside of frames for them to be recognized and listed in the table of contents. To create the table of contents type `\begin{frame}{Name of table of contents; e.g., Outline}`
`\tableofcontents`
`\end{frame}`

To present the table of contents one section at a time, type `\tableofcontents[pausesections]`.

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Special beamer Commands

- `\alert{Text to stress}`. For example **this is an alert**.
- `\againframe{Frame name}`. With the option `label=Title Page` for that frame, type `\againframe{Title Page}` and the Title Page will appear again as above.
- `\begin{columns}` and `\column[pos]{width}`.

For example in the next slide the two columns were produced by

```
\begin{columns}                                \column[t]{.5\textwidth}
\column[t]{.5\textwidth}                       \begin{itemize}
\begin{itemize}                                   \item label=$\langle$
\item allowframebreaks                          \textit{name for frame}$\rangle$
\item allowdisplaybreaks                       \item plain
\item \texttt{b, t, c} (default)               \item squeeze
\item fragile                                  \end{itemize}
\end{itemize}                                   \end{columns}
```

Slides

While the material to be presented is contained in frames, the output; that is, what's in the compiled file and what's seen on the screen, is contained in *slides*. Slides are composed of all or part of what's in the frame. There are several ways to determine what parts of a frame appear in any one slide and how many slides will be constructed from one frame.

The `\pause` Command

The easiest method for creating multiple slides from one frame is with the `\pause` command.

```
\begin{itemize}
\item Item for all slides\pause
\item Item for slides 2 & 3\pause
\item Item for slide 3 only
\end{itemize}
```

- Item for all slides

The `\pause` Command

The easiest method for creating multiple slides from one frame is with the `\pause` command.

```
\begin{itemize}
```

```
\item Item for all slides\pause
```

```
\item Item for slides 2 & 3\pause
```

```
\item Item for slide 3 only
```

```
\end{itemize}
```

- Item for all slides
- Item for slides 2 & 3

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\item Item for slide 3 only
\end{itemize}
```

- Item for all slides
- Item for slides 2 & 3
- Item for slide 3 only

The `\pause` command and similar ones to follow don't work inside of the `amsmath` environments.

First Encounter with *overlay specifications*

The `\alert` command can be used to emphasize one of the items on each slide using *overlay specifications*.

```
\begin{itemize}
\item<alert@1,3> Item for all
slides\pause
\item<alert@2> Item for slides
2 & 3\pause
\item<alert@3> Item for slide 3 only
\end{itemize}
```

- Item for all slides

First Encounter with *overlay specifications*

The `\alert` command can be used to emphasize one of the items on each slide using *overlay specifications*.

```
\begin{itemize}
\item<alert@1,3> Item for all
slides\pause
\item<alert@2> Item for slides
2 & 3\pause
\item<alert@3> Item for slide 3 only
\end{itemize}
```

- Item for all slides
- Item for slides 2 & 3

First Encounter with *overlay specifications*

The `\alert` command can be used to emphasize one of the items on each slide using *overlay specifications*.

```
\begin{itemize}
\item<alert@1,3> Item for all
slides\pause
\item<alert@2> Item for slides
2 & 3\pause
\item<alert@3> Item for slide 3 only
\end{itemize}
```

- Item for all slides
- Item for slides 2 & 3
- Item for slide 3 only

The \only Command

`\only<overlay specifications>\{content\}` is used to specify on which slides specific *content* will appear.

This text will be on all slides.

```
\only<2,4>\{This text, on slides  
2 \& 4.\}
```

```
\only<1,3->\{This text, on slides  
1, 3 and all subsequent slides.\}
```

```
\only<3>\{This text, on slide  
3 only.\}
```

And this text will be
on all slides.

(*Slide 1*)

This text will be on all
slides. This text, on
slides 1, 3 and all
subsequent slides. And
this text will be on all
slides.

The \only Command

`\only<overlay specifications>\{content\}` is used to specify on which slides specific *content* will appear.

This text will be on all slides.

```
\only<2,4>\{This text, on slides  
2 \& 4.\}
```

```
\only<1,3->\{This text, on slides  
1, 3 and all subsequent slides.\}
```

```
\only<3>\{This text, on slide  
3 only.\}
```

And this text will be
on all slides.

(*Slide 2*)

This text will be on all
slides. This text, on
slides 2 & 4. And this
text will be on all slides.

The \only Command

`\only<overlay specifications>\{content\}` is used to specify on which slides specific *content* will appear.

This text will be on all slides.

```
\only<2,4>\{This text, on slides  
2 \& 4.\}
```

```
\only<1,3->\{This text, on slides  
1, 3 and all subsequent slides.\}
```

```
\only<3>\{This text, on slide  
3 only.\}
```

And this text will be
on all slides.

(*Slide 3*)

This text will be on all slides. This text, on slides 1, 3 and all subsequent slides. This text, on slide 3 only. And this text will be on all slides.

The \only Command

`\only<overlay specifications>\{content\}` is used to specify on which slides specific *content* will appear.

This text will be on all slides.

```
\only<2,4>\{This text, on slides  
2 \& 4.\}
```

```
\only<1,3->\{This text, on slides  
1, 3 and all subsequent slides.\}
```

```
\only<3>\{This text, on slide  
3 only.\}
```

And this text will be
on all slides.

(*Slide 4*)

This text will be on all
slides. This text, on
slides 2 & 4. This text,
on slides 1, 3 and all
subsequent slides. And
this text will be on all
slides.

The `\onslide` Command

The effect of the `\only` command is as if all material not selected for a slide by `\only` were removed from the frame. The `\onslide` command has the same syntax as the `\only` command but the effect is as if the material not selected for the slide was simply covered up. Here's the previous frame with `\only` replaced by `\onslide`.

An \onslide Example

This text will be on all slides.

```
\onslide<2,4>{This text, on  
slides 2 \& 4.}
```

```
\onslide<1,3->{This text, on  
slides 1, 3 and all subsequent  
slides.}
```

```
\onslide<3>{This text, on  
slide 3 only.}
```

And this text will be
on all slides.

(Slide 1)

This text will be on all
slides.

This text,
on slides 1, 3 and all
subsequent slides.

And
this text will be on all
slides.

The \only Command

`\only<overlay specifications>\{content\}` is used to specify on which slides specific *content* will appear.

This text will be on all slides.

```
\only<2,4>\{This text, on slides  
2 \& 4.\}
```

```
\only<1,3->\{This text, on slides  
1, 3 and all subsequent slides.\}
```

```
\only<3>\{This text, on slide  
3 only.\}
```

And this text will be
on all slides.

(*Slide 1*)

This text will be on all
slides. This text, on
slides 1, 3 and all
subsequent slides. And
this text will be on all
slides.

An \onslide Example

This text will be on all slides.

```
\onslide<2,4>{This text, on  
slides 2 \& 4.}
```

```
\onslide<1,3->{This text, on  
slides 1, 3 and all subsequent  
slides.}
```

```
\onslide<3>{This text, on  
slide 3 only.}
```

And this text will be
on all slides.

(Slide 2)

This text will be on all
slides. This text, on
slides 2 & 4.

And
this text will be on all
slides.

An \onslide Example

This text will be on all slides.

```
\onslide<2,4>{This text, on  
slides 2 \& 4.}
```

```
\onslide<1,3->{This text, on  
slides 1, 3 and all subsequent  
slides.}
```

```
\onslide<3>{This text, on  
slide 3 only.}
```

And this text will be
on all slides.

(Slide 3)

This text will be on all
slides.

This text,
on slides 1, 3 and all
subsequent slides. This
text, on slide 3 only. And
this text will be on all
slides.

An \onslide Example

This text will be on all slides.

```
\onslide<2,4>{This text, on  
slides 2 \& 4.}
```

```
\onslide<1,3->{This text, on  
slides 1, 3 and all subsequent  
slides.}
```

```
\onslide<3>{This text, on  
slide 3 only.}
```

And this text will be
on all slides.

(Slide 4)

This text will be on all
slides. This text, on
slides 2 & 4. This text,
on slides 1, 3 and all
subsequent slides.

And
this text will be on all
slides.

A Second \onslide Example

One great advantage of the `\onslide` command over the `\only` command is that the text that is “covered” can be made slightly transparent with the command `\setbeamercovered{transparent= % of transparency}`. Here the % is 40.

This text will be on all slides.

This text, on slides 2 & 4.

This text, on slides 1, 3 and all following slides

This text, on slide 3 only.

And this text will be on all slides.

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This text will be on all slides.

This text, on slides 2 & 4.

This text, on slides 1, 3 and all following slides

This text, on slide 3 only.

And this text will be on all slides.

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`\setbeamercovered{transparent= % of transparency}`. Here the % is 40.

This text will be on all slides.

This text, on slides 2 & 4.

This text, on slides 1, 3 and all following slides

This text, on slide 3 only.

And this text will be on all slides.

Hyperlinks and Buttons





The **beamer** command that will produce a button to jump from a current slide to a target slide is

`\hyperlink{target}{button text}<\langle overlay specification \rangle>`.

It goes in the frame that produces the current slide. If that frame produces more than one slide, the *overlay specification* determine on which slide(s) the button appears and the command must be so placed that it will be included in the first slide in the list. There are many different *buttons* to indicate the type of jump that will occur when clicking the button, such as skipping the next slide, skipping all remaining slides produced from the current frame, or returning to an earlier slide. The next slides presents the choices for *button text*.

Meaning of the *button text* Argument

The *button text* refers to the appearance of a button that can be made into a hyperlink. The choices are:


- `\beamerbutton{Just a Button};` 
- `\beamergotobutton{Go to Button};` 
- `\beamerreturnbutton{Return From};` 
- `\beamerskipbutton{Skip to Button};` 

How to name and designate the *target* of the button is next.

The *target*

The *target* identifies the frame that produces the target slide. Use the `label=` option to give the target frame a *name*. If the frame produces more than one slide, include the number of the slide in the *target*. For example, `name<2>` makes the second slide produced by the frame, *name* the target slide. If only one slide is produced by the frame, the *overlay specification* may be omitted.

A button Example

For example the next button was created by typing
`\hyperlink{bibliography}{\beamergotobutton{Go to
Refs}}`.  The `\hyperlink` command must appear at
the precise point where the button is to appear. Watch what
happens when the button is clicked.

Animations and Movies

To include a movie or animation in a presentation, first put `\usepackage{multimedia}` in the preamble. The command for including a movie in a slide is

`\movie[options]{banner}{movie_filename}`. As options, specify the `height` and `width` of the box in which the movie will appear. Other options can be found in [?, page 126]. For *banner* text or graphics that can be used to introduce the movie. Any movie file that can be displayed with QuickTime should work but the file must be in the same folder as the source file. Clicking the *banner* in the slide will run the movie, but the pdf file **must be opened in Acrobat**.

An Example

Typing `\movie[height=.6\textheight,width=.8\textheight]{Destruction}{100_2073.MOV}` will play the following movie.

Destruction

Navigation Bar



- ① Slides
- ② Frames
- ③ Subsubsections
- ④ Subsections
- ⑤ Sections
- ⑥ Search

The Structure of a Frame

- headline and/or footline
- left or right sidebar
- navigation bar
- logo
- background color
- content

Beamer Themes

- themes: 26 Loaded with `\usetheme{theme_name}`.
- outer themes: 9 Loaded with `\useoutertheme{outer_theme_name}`.
- inner themes: 5 Loaded with `\useinnertheme{inner_theme_name}`.
- color themes: 15 Loaded with `\usecolortheme{color_theme_name}`.

Suggestions: `\usefonttheme{serif}` to use the *roman* font family. `\useinnertheme{rounded}` to replace triangles by bullets in an itemize list.

Beamer Modes

- beamer (default)
- presentation
- handout
- trans (transparencies)
- article
- all

These modes are loaded with `\mode<mode_name>`. They may also appear in the `<overlay specification>` option in the `\begin{frame}` command or as an option to the `\documentclass`.

The handout Mode

To produce handouts, change the `\documentclass` command to `\documentclass[handout]{beamer}` and add

- `\usepackage{pgfpages}` This disables hyperlinks.
- `\pgfpagesuselayout{4 on 1}` Puts 4 slides on each page.
- `\setbeamertemplate{navigation symbols}{}` Turns on navigation bars at the bottom of each slide.

References



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