

# Introduction to Latex – Beamer

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# Beamer advantages

- The standard commands of  $\text{\LaTeX}$  also work in Beamer. If you can write basic  $\text{\LaTeX}$ , you can easily make a Beamer presentation
- A table of contents will automatically be created, complete with click-able links to each section and subsection you create in your presentation
- You can easily create overlays and dynamic effects
- Themes allow you to change the appearance of your presentation to suit your purposes
- Each theme is designed to be highly usable and readable. This makes the presentation easier for the audience to follow and more professional looking overall

## More Beamer advantages

- The layout, colors, and fonts used in a presentation can easily be changed globally, but you still also have control over the most minute detail
- You can create presentations using the same source you wrote for your  $\text{\LaTeX}$  articles
- The final output is typically a .pdf file. Viewer applications for this format exist for virtually every platform
- Your presentation will look exactly the same no matter which computer or viewer program is being used

# Frame

- Each Beamer project is made up of a series of frames
- Each frame produces one or more slides, depending on the slides overlays, which will be discussed later
- A frame is produced with the environment `frame`; it may come in one of the following forms:
  - ▶ `\begin{frame}{Frame title}`
  - ▶ `\begin{frame}{Frame title}{Frame subtitle}`
- ▶ Both of these forms can take an optional argument that specifies the vertical alignment of the content of a frame `c` for centered (the default), `t` for top, or `b` for bottom

## Example

```
\begin{frame}[t]{Frame title goes here}  
Frame body text and/or LATEX code  
\end {frame}
```

# Titling Information

Titling information go in the preamble, just as in normal  $\LaTeX$ .

- `\title [short title ] {long title}`
- `\subtitle[short subtitle]{long subtitle}`
- `\author[short name]{long name}`
- `\date[short date]{long date}`
- `\institution[short name]{long name}`

As in normal  $\LaTeX$  documents, titling information are not actually printed until you tell it to do so, with the command `\titlepage`

## Example

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

# Table of Contents

- The table of contents is created dynamically on the sections and subsections of the presentation, with the command `\tableofcontents`
- It takes a number of optional arguments; the most common is `pausesections`, which pauses between items in the table of contents

## Example

```
\begin{frame}  
\tableofcontents[pausesections]  
\end {frame}
```

# Sections and Subsections

- We use the LATEX commands we already know  
`\section` `\subsection` `\subsubsection`
- Sectioning commands should be placed **outside** frames These commands create entries in the table of contents
- They also create entries in the navigation bar (if one is available)
- They do NOT create a frame heading

## Example

```
\section{Beamer basics}
\begin{frame}
  Sectioning commands are placed \textbf{outside} frames.
\end{frame}
```

# Common text commands and environment

- You can use the same text commands in Beamer as you do in LATEX to change the way your text is displayed  
`\emph` `\textbf` ...
- You can also use the same LATEX environments  
`enumerate` `itemize` `description` ...
- The same goes for alignment environments  
`center` `flushleft` `flushright`

- A vertical space can be indicated by using the `\vskip<number>pt` command  
→ For example, `\vskip15pt` will produce a 15 point vertical space
- Horizontal spaces are indicated similarly with the command `\hskip< number >pt`; horizontal spaces are useful for indenting text or graphics → Other measurements can also be used, such as centimeters: `\vskip2cm`
- Negative values can also be used to squeeze text or graphics together → `\vskip-10pt` or `\hskip-1cm`

- Having parts of your slides appear incrementally aids the audience by bringing their attention to the information that is currently being discussed
- In **Beamer**, **overlays** control the order in which parts of the frame appear

An easy way to implement an overlay is to place the `\pause` command between the parts you want to show up separately.

## Example

`\htextbf{Step 1 :}` Compute the maximal suffix of  $w$  with respect to  $\preceq_l$  (say  $v$ ) and the maximal suffix of  $w$  with respect to  $\backslash\preceq_r$  (say  $v$ ).

`\pause`

`\textbf{Step 2 :` Find words  $u$ ,  $u$  such that  $w = uv = uv$ .

`\pause`

`\textbf{Step 3 :}` If  $|v| \leq |v|$ , then output  $(u, v)$ . Otherwise, output  $(u, v)$ .

# Overlay Specifications

- ▶ For more advanced overlays, many commands and environments incorporate **overlay specifications**.
- ▶ To understand overlay specifications, we must first understand how a frame is displayed in the presentation
- ▶ Most often, a frame will represent a single slide in the presentation
- ▶ However, to display effects such as appearing text, multiple slides are revealed in succession to give the illusion of more material appearing in the same slide
- ▶ For example, `\pause` creates multiple separate slides. The first slide displays the information contained above the first `\pause`, the second slide displays the information down to the second `\pause`, and so on.

# Overlay Specifications

- Overlay specifications are given in pointed brackets ( $\langle, \rangle$ ) and indicate which slide the corresponding information should appear on.
  - ▶ The specification  $\langle 1 - \rangle$  means “display from slide 1 on”.
  - ▶  $\langle 1 - 3 \rangle$  means “display from slide 1 to slide 3”.
  - ▶  $\langle -3, 5 - 6, 8 - \rangle$  means “display on all slides except slides 4 and 7”.

## Example

<code>\begin{itemize}</code>		● <i>abcadcabc</i>
<code>\item &lt; 1 &gt;</code>	<code>\$abcadcabc\$</code>	● <i>abcabcabc</i>
<code>\item &lt; 1 - 2 &gt;</code>	<code>\$abcabcabc\$</code>	● <i>accaccacc</i>
<code>\item &lt; 1 - 2 &gt;</code>	<code>\$accaccacc\$</code>	● <i>bacbccbac</i>
<code>\item &lt; 1 &gt;</code>	<code>\$bacbccbac\$</code>	● <i>cacdaccac</i>
<code>\item &lt; 1, 3 &gt;</code>	<code>\$cacdaccac\$</code>	● <i>caccaccac</i>
<code>\item &lt; 1 - 2 &gt;</code>	<code>\$caccaccac\$</code>	● <i>caccaccac</i>
<code>\end{itemize}</code>		

## Note

If you want each item of a list to appear in order, use the  $\langle + - \rangle$  option. (i.e. `\beginitemize[< + - >]`)

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## Example

```
\begin{itemize}
\item < 1 >      $abcdcab$
\item < 1 - 2 >  $abcabcabc$
\item < 1 - 2 >  $accaccacc$
\item < 1 >      $bacbccbac$
\item < 1, 3 >   $caccaccac$
\item < 1 - 2 >  $caccaccac$
\end{itemize}
```

- *abcdcab*
- *abcabcabc*
- *accaccacc*
- *bacbccbac*
- *caccaccac*
- *caccaccac*

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\item < 1 - 2 >  $caccaccac$
\end{itemize}
```

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- *bacbccbac*
- *caccaccac*
- *caccaccac*

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If you want each item of a list to appear in order, use the  $\langle +- \rangle$  option. (i.e.  $\backslash\begin{itemize}\langle +- \rangle$ )

## Overlay Specifications - Special commands

Each command below takes a single argument on which it applies the corresponding action

- `\ only < 1, 2 >` The argument only appears on specified slides on all other slides, **it will occupy no space**
- `\ visible < 1, 2 >` The argument appears on specified slides and is **completely invisible** in all others, but still occupies space
- `\ invisible < 1, 2 >` The opposite of visible
- `\ uncover < 1, 2 >` The text will only be “uncovered” on the specified slides. On other slides, the text will still be typeset and will appear:
  - ▶ **transparent**, if the command `\setbeamercoveredtransparent` has been given in the preamble, or
  - ▶ **invisible**, if this command has not been given

There is also the command `wich` that takes two arguments: the first argument shows up on the specified slides, while the second shows up on all unspecified slides.

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# Exercise

- ▶ Create a beamer frame that contains three paragraphs. Apply each of the overlay commands specified above on the second paragraph and notice their differences
- ▶ In order to be able to see the differences more clearly, add the following command in the preamble `\setbeamercoveredtransparent`
- ▶ Next, remove the above command and notice the similarity between `\visible` and `\uncover`

Environments can also be overlay specification aware.

## Example

```
\begin{frame}
\begin{theorem}<1->
There exists an infinite set.
\end{theorem}
\begin{proof}<2->
This follows from the axiom of infinity.
\end{proof}
\\end{frame}
```

# Overlay specifications – Environments

For each of the basic commands that take overlay specifications, there is an equivalent environment that will also take overlay specifications.

- `onlyenv` similar to `\only`
- `altenv` similar to `\alt`
- `visibleenv` similar to `\visible`
- `uncoverenv` similar to `\uncover`
- `invisibleenv` similar to `\invisible`

## Example

```
\begin{uncoverenv}<2->
This test will only appear from slide 2
onwards. I can even add maths, or any other
object here
\[ x= \int 0^{\infty} x \mathrm{d}x \ ]
\end{uncoverenv}
```

Beamer provides many ways to structure your frames so they appear well organized and are easy for the audience to follow. We will focus on:

- ▶ Columns
- ▶ Blocks
- ▶ Boxes (Borders)

# Columns

The column environment is called as shown below:

## Example

```
\begin{columns}
\column{.xx\textwidth}
First column text and/or code
\column{.xx\textwidth}
Second column text and/or code
\end{columns}
```

where .xx is the percentage of the width of the slide.

## Example

```
\begin{columns}
\column{.5\textwidth}
Column Number 1
\column{.5\textwidth}
Column Number 2
\end{columns}
```

Which gives us:

Column Number 1	Column Number 2
-----------------	-----------------

# Blocks

Blocks can be used to separate a specific section of text or graphics from the rest of the frame

## Example

```
\begin{block}{Introduction to \LaTeX}
Beamer is a \LaTeX class for creating
presentations that are held using a projector
\ldots
\end{block}
```

Output:

## Introduction to $\LaTeX$

Beamer is a  $\LaTeX$  class for creating presentations that are held using a projector. . .

# Blocks

Other block environments are also available. Each environment can be used in place of block and has its own color scheme.

- **block** – Generic block
- **theorem** – Theorems
- **lemma** – Lemmas
- **proof** – Proofs
- **corollary** – Corollaries
- **example** – Examples
- **alertblock** – Highlighted title

## Note

You can define your own theorem-like environment by putting the following in the preamble:

```
\newtheorem{myblock}{My block title}
```

# Columns and blocks

We can combine columns and blocks to make a much cleaner looking presentation.

## Example

```
\begin{columns} [t]  
  \column{.45\textwidth}  
  \begin{block}{Column 1 Header}  
    Column 1 Body Text  
  \end{block}  
  \column{.45\textwidth}  
  \begin{block}{Column 2 Header}  
    Column 2 Body Text  
  \end{block}  
\end{columns}
```

## Note

Notice the `[t]` argument to make the columns top-aligned as opposed to vertically centered on the slide

### Column 1 Header

Column 1 Body Text

### Column 2 Header

Column 2 Body Text

## Text boxes

Borders can also be used to add structure and organization to your presentation. To access these commands, you must first add

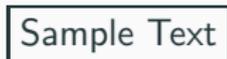
```
\usepackage{fancybox}
```

to the preamble of your file.

```
\shadowbox{SampleText}
```



```
\fbox{Sample Text}
```



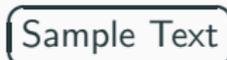
```
\doublebox{Sample Text}
```



```
\ovalbox{Sample Text}
```



```
\Ovalbox{Sample Text}
```



- Including graphics can be done in the same way as in any LATEX document
- Load the `graphicx` package
- Use the `\includegraphics` command

# Themes

Themes can change the entire look and feel of your presentation.

Different themes can be selected by using the

`\usetheme`

command at the preamble and pass as argument the name of the theme

Antibes	Bergen	Berkeley	Berlin
Boadilla	Copenhagen	Darmstadt	Dresden
Frankfurt	Goettingen	Hannover	Ilmenau
Juanlespins	Madrid	Malmoe	Marburg
Montpellier	Paloalto	Pittsburgh	Rochester
Singapore			

You can preview all the available themes here:

[http://deic.uab.es/~iblanes/beamer\\_gallery/index.html](http://deic.uab.es/~iblanes/beamer_gallery/index.html)

## Color themes

If you like the layout of a certain theme but dislike the color, you can easily invoke a color theme, which is a set of complimentary colors for all the elements of your presentation. To use a color theme place

`\usecolortheme{}`

in the preamble of your .tex document and pass the theme of your choice

albatross

crane

beetle

dove

fly

seagull

wolverine

beaver

# Inner Color Themes

Inner color themes specify only colors of inner elements, most notably the colors of blocks. They are selected the same way regular color themes are chosen:

```
\usecolortheme{}
```

You can choose from:

lily

orchid

rose

# Outter color themes

Outter color themes change the palette colors, which are the colors the headline, footline, and sidebar are based on. They are selected the same way regular color themes are chosen:

```
\usecolortheme{}
```

You can choose from:

whale

seahorse

dolphin

- Font themes change the attributes of the fonts used in the presentation
- Each font theme has its own set of options, so to fully take advantage of the font theme, you should look up the options in the Beamer User Guide.
- To use a font theme, use the command `\usefonttheme{}`
- You can choose from these font themes:

serif

structurebold

structureitalicserif

structuresmallcapserif

- Choosing the font size is done similarly to other  $\LaTeX$  documents.
- Just add the appropriate option in the document class

```
\documentclass[10pt]{beamer}
```

- Instead of using 10pt, you could use 11pt (default size), or 12pt

- Different font families can be chosen to personalize your presentation.
- To use a different font family, load the corresponding package **serif**  
**avant bookman chancery charter euler helvet mathtime**  
**mathptm mathptmx newcent palatino pifont utopia**
- All font families are not available in every Beamer installation, but typically, at least some will be available

# Creating handouts

- Add the `handout` option in the document class

```
\documentclass [handout] {beamer}
```

- All overlays will be “flattened”
- If you also want to print two or more slides on each page, use the `pgfpages` package as follows: 

```
\usepackage{pgfpages}
```

```
\pgfpagesuselayout{2 on 1}[a4paper,border shrink=5mm]
```

  - ▶ Instead of 2 on 1 you can use 4, 8 and 16 on 1
  - ▶ The border shrink option provides some space between slides
  - ▶ The landscape option is required depending on whether your pages are portrait/landscape.

- The `beamerposter` package can be used to create  $\text{\LaTeX}$  posters in landscape or portrait orientation
- It is an extension of the `beamer` and the `a0poster` classes
- Load the `beamerposter` package using the following optional arguments
  - ▶ `orientation=portrait` or `landscape`
  - ▶ `size=a0` or `a1`, `a2`, `a3`, `a4`, `custom`
  - ▶ `scale=1.4` scales the font size
  - ▶ If you set `size=custom` then you can use the options `width=15cm` or `height=21cm` to set a custom size
- ▶ Use the `columns` environment for better presentation.
- ▶ It is highly advisable to use (after customizing to your own needs!) one of the available `beamerposter` themes found in:  
<http://www-i6.informatik.rwth-aachen.de/~dreuw/latexbeamerpo>

# Using beamerposter themes

- 1 Download one of the available beamerposter themes and store it in the same directory as the .tex file of your poster
  - ▶ The file will have extension .sty, e.g. `beamerthemel6pd2.sty`
- 2 Add the following command in the preamble of your poster .tex source file (before loading the beamerposter package):  
`\usetheme{l6pd2}`
  - ▶ Notice that we remove the beamertheme keyword from the file name
- 3 Load the `beamerposter` package, as well as the packages:  
`fp,xkeyval,type1cm,paralist`
- 4 Download `tangocolors.sty` and store it in the same directory
- 5 Open the theme file, e.g. `beamerthemel6pd2.sty`, in Texmaker for customization
  - ▶ Find the `\includegraphics` command and replace the logo with your own (or comment out if you have none)
  - ▶ Customize the footnote
  - ▶ Change the appearance of any other element you wish, e.g. title alignment, etc.

# Exercise

- Create a poster of your own, using the l6pd2 theme
- Remove the logo
- Change the formatting of the title so that it appears centered (rather than right-aligned)
- Update the footline with your own data

## Where to go next

- Beamer user guide

<http://ftp.ntua.gr/mirror/ctan/macros/latex/contrib/beamer/d>

- Complete set of beamer documentation and examples

<http://www.ctan.org/tex-archive/macros/latex/contrib/beamer/>

- The beamerposter package

<http://www-i6.informatik.rwth-aachen.de/~dreuw/latexbeamerpo>



Charles T. Batts,

**A Beamer Tutorial in Beamer**

2007.