Beamer
A \LaTeX\ class for making presentations

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UC Berkeley

Berkeley, January 28, 2011.
Main message

- Beamer looks nice
Beamer looks nice, especially if you have lots of math in your presentation
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- Beamer provides great structure automatically
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Beamer provides great structure automatically, but also gives great flexibility.
Main message

- Beamer looks nice, especially if you have lots of math in your presentation
- Beamer provides great structure automatically, but also gives great flexibility
- Beamer is easy to learn
  - Just sit down and play with it
  - *Lots* of resources online
Outline

Basics

Math, lists, columns, etc.

Graphics
  Importing Graphics
  Using Beamer
  Animations

Resources
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Basic setup

\documentclass{beamer}
...
\usetheme{Berkeley}
...
\begin{document}
\begin{frame}
...
\end{frame}
\end{document}
There are *many* style templates; Sebastian Pipping created the Beamer Theme Matrix:
Styles

There are *many* style templates; Sebastian Pipping created the Beamer Theme Matrix:

And you can also specify anything you want yourself!
Title page

\documentclass{beamer}
...
\usetheme{Berkeley}
...
\title{Beamer}
\author{Miklos Z. Racz}
\subtitle{\small A \LaTeX\ class for making presentations}
\date{Berkeley, January 28, 2011.}
\institute{UC Berkeley}
...
\begin{document}

\frame{\titlepage}

\begin{frame}
...
\end{frame}

\end{document}
\begin{document}
\frame{\titlepage}
\frame{\tableofcontents}
\section{Intro}
\section{Model}
\subsection{2 particles}
\subsection{3 particles}
\section{Results}
\end{document}
Frames

Frames are the basic “building blocks” of presentations.

You can do basically anything (and more) in frames that you can do in a simple \LaTeX\ document.

\[
e^{i\pi} + 1 = 0
\]
Simple example of flexibility
Simple example of flexibility

To delete these:

\setbeamertemplate{navigation symbols}{}
\setbeamertemplate{footline}{}
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Math

You can do everything here that you can in \LaTeX\!. Inline math:
\[ d(x, y) \leq d(x, z) + d(z, y). \]

One of Ramanujan’s famous identities:
\[
\frac{1}{\pi} = \frac{2\sqrt{2}}{9801} \sum_{k=0}^{\infty} \frac{(4k)!(1103 + 26390k)}{(k!)^4 396^{4k}}.
\]

Math environments work just the same:

\begin{definition}
A prime number is a natural number that has exactly two distinct natural number divisors: 1 and itself.
\end{definition}
The value of the Gaussian integral is $\sqrt{\pi}$:

\[
\int_{-\infty}^{\infty} e^{-x^2} \, dx = \sqrt{\pi}.
\]

Proof.
Square the Gaussian integral and switch to polar coordinates:

\[
\left( \int_{-\infty}^{\infty} e^{-x^2} \, dx \right)^2 = \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} e^{-(x^2+y^2)} \, dx \, dy
\]

\[
= \int_{0}^{\infty} \int_{0}^{2\pi} e^{-r^2} \, r \, dr \, d\theta = 2\pi \int_{0}^{\infty} r e^{-r^2} \, dr = \pi.
\]
Lists

It’s easy to make lists:

- Apple
- Orange
- Banana

It’s also possible to pause:
Lists

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It’s also possible to pause:

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- Banana
Lists

\begin{itemize}
\item \textcolor{red}{Apple}
\item \textcolor{orange}{Orange}
\item \textcolor{yellow}{Banana}
\end{itemize}

\begin{itemize}
\item \textcolor{red}{Apple}\pause
\item \textcolor{orange}{Orange}\pause
\item \textcolor{yellow}{Banana}
\end{itemize}
Lists

You can do it in an even different way:

- Apple
Lists

You can do it in an even different way:

- Apple
- Orange
- Blueberry
Lists

You can do it in an even different way:

- Apple
- Orange
- Banana
- Blueberry
Lists

You can do it in an even different way:

- Apple
- Orange
- Blueberry
- Blackberry
\begin{itemize}
\item<1-> {\color{red} Apple}
\item<2-> {\color{orange} Orange}
\item<3> {\color{yellow} Banana}
\item<2-> {\color{blue} Blueberry}
\item<4-> Blackberry
\end{itemize}
Columns

...left column...
...left column...
...left column...
...right column...
...right column...
...right column...

This is in the middle at the bottom.
Columns

\begin{columns}
\column{0.5\textwidth}
\begin{center}
...left column...\\
...left column...\\
...left column...
\end{center}
\column{0.5\textwidth}
\begin{center}
...right column...\\
...right column...\\
...right column...
\end{center}
\end{columns}

\vfill

\begin{center}
This is in the middle at the bottom.
\end{center}
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Resources
Pictures from campus

You can see Evans Hall to the right...
Pictures from campus

You can see Evans Hall to the right...

...and the Campanile to the left...
Including image files

It’s easy to include image files:

\includegraphics[width=0.9\textwidth]{evans.eps}
Including image files

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\includegraphics[width=0.9\textwidth]{evans.eps}

**Note:** be careful with file formats.
If you compile with *latex*, you can only use *.eps*.
If you compile with *pdflatex*, then you can use *.jpg, .png, .pdf* (but cannot use *.eps*).
Including image files

It’s easy to include image files:

```
\includegraphics[width=0.9\textwidth]{evans.eps}
```

**Note:** be careful with file formats.
If you compile with *latex*, you can only use *.eps*.
If you compile with *pdflatex*, then you can use *.jpg, .png, .pdf* (but cannot use *.eps*).

(But these are not big issues.)
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Making figures in $\LaTeX$/Beamer

There are many ways to make figures inside $\LaTeX$. My favorite is using

PSTricks

which is a set of macros that allows you to draw your own PostScript-based drawing directly inside $\LaTeX$.

(Add `\usepackage{pstricks}` to the preamble of your $\LaTeX$ file.)
A simple example

Figure: You can create captions too.
The code is not horrible at all

\def\ManLeft{%
  %% Little man going left
  \psline[linewidth=1pt](0,0)(0.3,0.5) % left leg
  \psline[linewidth=1pt](0.6,0)(0.3,0.5) % right leg
  \psline[linewidth=1pt](0.3,0.5)(0.3,1.2) % body
  \psline[linewidth=1pt](0.3,1)(0,0.7) % arm
  \pscircle[linewidth=1pt](0.3,1.4){0.2} % head
}

\def\ManRight{%
  %% Little man going right
  \psline[linewidth=1pt](2.2,2.2)(1.4,1.4) % right arm
  \psline[linewidth=1pt](1.4,1.4)(1.52,1.76) % upper body
  \psline[linewidth=1pt](1.4,1.4)(1.04,1.16) % left arm
  \psline[linewidth=1pt](1.4,1.4)(1.16,0.92) % lower body
  \psline[linewidth=1pt](1.16,0.92)(0.86,0.5) % right leg
  \psline[linewidth=1pt](1.16,0.92)(0.62,0.74) % left leg
  \pscircle[linewidth=1pt](1.58,1.94){0.1897} % head
}
The code is not horrible at all

\begin{figure}[ht]
\centering
\begin{pspicture}(12,6)
  \psline[linewidth=2pt]{->}(1,5)(12,5)
  \uput*{0.3}[90]{0}(11.5,5){\huge{$v$}}
  \uput*{0.3}[90]{0}(2,5){\large{rope}}
  \psline[linewidth=2pt]{<-}(1,1)(12,1)
  \uput*{0.3}[90]{0}(1.5,1){\huge{$c$}}
  \uput*{0.3}[90]{0}(10,0){\large{walkway}}
\caption{You can create captions too.}
\end{pspicture}
\end{figure}
A more complicated figure using PSTricks
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You can make nice animations in PSTricks as well.

The following two slides were made by Márton Balázs. A tutorial of how they were made (plus \LaTeX\ source code) can be found on his homepage:

http://www.math.bme.hu/~balazs/aniexl.html

The slides were originally part of a popularizing talk he gave on modeling traffic flow.
Emergence of traffic jams
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Emergence of traffic jams

We notice the slowly moving cars have to brake hard.

The end of the traffic jam is sharp.
Emergence of traffic jams

We notice the slowly moving cars \(\rightsquigarrow\) have to brake hard.

The end of the traffic jam is sharp.

This is part of the reason freeways are dangerous.
Dissolution of traffic jams
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Long and slow acceleration for cars in the back
Dissolution of traffic jams

Long and slow acceleration for cars in the back

Dissolution of the jam is not sharp.
Dissolution of traffic jams

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Resources
Resources

The internet is full of resources; perhaps the two best starting points are:

- Beamer Wikipedia page
  and the links and references found here
- Beamer user guide

[Just click]
This presentation is not meant to be a tutorial; it’s goal is to showcase that Beamer exists and that it is very useful.

However, many people have created short tutorials. Here are a few that are not linked from the Beamer Wiki page:

- by Charles T. Batts
- by Amber M. Smith
- by Steven G. Wicker

[Just click]
General \LaTeX{} resources

- \LaTeX{} Wikibooks—very useful!!
- The Comprehensive \LaTeX{} Symbol List
- Detexify: \LaTeX{} symbol classifier – perfect when you can’t remember the code for a character and it would take too long to look it up in symbols-a4.pdf

[Just click]
PSTricks resources

- PSTricks user’s guide
- Márton Balázs’ intro to animations using PSTricks

[Just click]
\LaTeX\ DeCal course

Math 98/198: \LaTeX\ for Math/Science
Evans M 5-7p

http://www.decal.org/1585