A Beamer Tutorial in Beamer

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Foundations of Computer Science
Outline

1. About Beamer
2. Templates
3. Frames
4. Sections and Subsections
5. Text
6. Alignment and Spacing
7. Lists
8. Overlays
9. Tables
10. Frame Structures
11. Graphics
12. Themes
13. Transitions
14. More Information
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Advantages of Beamer

- The standard commands of \LaTeX also work in Beamer. If you can write basic \LaTeX, you can easily make a Beamer presentation.
- A table of contents will automatically be created, complete with clickable 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 more professional looking and easier for the audience to follow.
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More Advantages of Beamer

- The layout, colors, and fonts used in a presentation can easily be changed globally, but you also have control over the most minute detail.
- You can create presentations using the same source you wrote for your 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.
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- Your presentation will look exactly the same no matter which computer or viewer program is being used.
Beamer is available as a free download from:
http://latex-beamer.sourceforge.net

It is very well documented in the Beamer User Guide
which is included in the Beamer package.
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The fastest way to get started with Beamer is to use a pre-made template.

One template is included with the Beamer distribution:
beamer/solutions/conference-talks/conference-ornate-20min.en.tex

Just copy the template file, paste it in the desired location, and modify the contents.
Test Your Template

- If you are using the template provided with the Beamer class, it will already be complete with example information.
- To see how the example presentation looks, compile your \LaTeX code twice.
- Open your favorite PDF viewer (ie: Adobe Reader) and open the newly created .pdf file located in the same directory as your template file. Change your view to “Full Screen”.
- Notice that a table of contents is automatically created, the sections and subsections are hyper-linked, and there is a row of navigational buttons in the bottom right corner.
The first commands you should modify will identify some key information about your presentation. These commands will be found in the preamble at the top of the .tex file. Other commands may be modified or commented out with a % to suit your needs.

**Commands To Change**

- \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}
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Each Beamer project is made up of a series of frames. Each frame produces one or more slides, depending on the slide’s overlays, which will be discussed later.

A Basic Frame

\begin{frame}[<alignment>]
  \frametitle{Frame Title Goes Here}
  Frame body text and/or \LaTeX\ code
\end{frame}
Frames are very simple to make. Simply write your own text or \LaTeX code between the begin/end frame commands.

The alignment option is centered [c] by default. The values [t] (top align) and [b] (bottom align) are also accepted.

A Basic Frame

\begin{frame}[t]
  \frametitle{Algorithmic Combinatorics on Words}
  \textit{Words}, or strings of symbols over..
\end{frame}
Frames

- The \texttt{plain} option for the frame environment causes the headlines, footlines, and sidebars to be suppressed. This can be useful for showing large pictures.

- If you already have a \LaTeX document, you can simply wrap \texttt{\begin{frame} and \end{frame}} commands around the information you want to present.
The **title page** frame simply displays a title page which contains much of the information your entered at the beginning of the document:

<table>
<thead>
<tr>
<th>Title Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>\begin{frame} \titlepage \end{frame}</td>
</tr>
</tbody>
</table>
By default, the `\titlepage` command creates a title page that includes:

- Title
- Author
- Affiliation
- Date
- Graphic

If any of these values are missing in the preamble, they will not be included on the title page.
The **table of contents** frame dynamically creates a table of contents based on the sections and subsections that you designate throughout the presentation:

\begin{frame}
  \frametitle{Outline}
  \tableofcontents[part=1,pausesections]
\end{frame}

Notice the argument `pausesections`. This allows the speaker to talk about the first section before the second is shown when reading the table of contents.
Putting Frames Together

Example

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

\begin{frame}
\frametitle{Outline}
\tableofcontents[part=1,pausesections]
\end{frame}

\begin{frame}
\frametitle{Introduction}
Body text / code of the frame goes here.
\end{frame}
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Presentations are divided into sections, subsections, and sub-subsections.

Each call to the \section{section name}, \subsection{subsection name}, or \subsubsection{sub-subsection name} command:

- Inserts a new entry into the table of contents at the appropriate tree-level.
- Inserts a new entry into the navigation bars.
- Does not create a frame heading.

Another version of the command, \subsection*{section name}, only adds an entry in the navigation bars, not the table of contents.
Sections and Subsections

Section specifications are declared \textit{between} the frames, so they have no direct effect on what is shown \textit{inside} each frame.

Example

\begin{frame}

\section{Fine and Wilf's Theorem}
\subsection{The Case of Two or Three Holes}
\subsubsection{Definition 3.7}

\begin{frame}

\end{frame}
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You can use the same text commands and environments in Beamer that you do in \LaTeX to change the way your text is displayed.

**Common Text Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Sample Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textbf{}</td>
<td>Sample Text</td>
</tr>
<tr>
<td>\textit{}</td>
<td>Sample Text</td>
</tr>
<tr>
<td>\textsl{}</td>
<td>Sample Text</td>
</tr>
<tr>
<td>\alert{}</td>
<td>Sample Text</td>
</tr>
<tr>
<td>\texttt{}</td>
<td>Sample Text</td>
</tr>
<tr>
<td>\color{green}</td>
<td>Sample Text</td>
</tr>
<tr>
<td>\structure{}</td>
<td>Sample Text</td>
</tr>
</tbody>
</table>
Verbatim Text

It is often helpful to write code or formulas as `verbatim` text, which shows the text exactly as you type it, without any \LaTeX formatting. There are two ways to achieve this:

- For inline verbatim text, such as `sample text`, use the `text` command:

  \verb|sample text|

- The `verbatim` environment is also available in Beamer and can be used in the same way as it is in \LaTeX:

  \begin{verbatim}
  Sample text
  \end{verbatim}

**NOTE:** For either of these methods to work, the `[fragile]` option must be added to the frame environment. (i.e. `\begin{frame}[fragile]`)
Semiverbatim Text

Beamer also defines the environment `semiverbatim`, which works like `verbatim` except that `\`, ``, `{`, and `}` retain their meaning.

This allows you to access Beamer formatting commands. If you want the command or environment to be ignored, you simply put a `\` in front of it.

Example

Using the `semiverbatim` environment, you can still format verbatim text with Beamer commands or you can display commands `\alert{like this}.`
Font Themes

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{serif}
```

You can choose from these font themes:

| serif       | structureitalicserif | structurebold     | structuresmallcapsserif |
Font Sizes

Choosing the font size for normal text is quite easy. You must locate the line in the header of your .tex document that looks like this:

\documentclass{beamer}

Then, add the appropriate option so it looks like this:

\documentclass[10pt]{beamer}

Instead of using \texttt{10pt}, you could use \texttt{11pt} (default size), or \texttt{12pt} (slightly larger). Other options are also available but require additional packages to be installed. More information can be found in the Beamer User Guide.
Different **font families** can be chosen to personalize your presentation. Each font family resides in a separate package. To use a different font family, add the following command to your preamble:

```
\usepackage{helvet}
```

Not all font families are available in every Beamer installation, but at least some of the following families will typically be available:

- serif
- avant
- bookman
- chancery
- charter
- euler
- helvet
- mathtime
- mathptm
- mathptmx
- newcent
- palatino
- pifont
- utopia
Alignment

A frame can be assigned a **left**, **center**, or **right alignment** with the `flushleft`, `center`, and `flushright` environments. For example:

\begin{center}
  The center-aligned text goes here.
\end{center}
Spacing

- 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.
Lists are often used in presentations to organize information in a manner that is easier for the audience to follow. Beamer includes three methods for displaying lists:

- **Itemize** Used to display a list of items that do not have a special ordering.
- **Enumerate** Used to display a list of numbered, ordered items.
- **Description** Used to display a list that explains or defines labels.
Each list environment is structured in a very similar way. Each new item is indicated by the `\item` command.

**Example of Itemize**

\begin{itemize}
\item The first item
\item The second item
\item The third item
\item The fourth item
\end{itemize}
By using the `enumerate` environment instead of the `itemize` environment, the items are displayed in a numbered list.

Example of Enumerate

\begin{enumerate}
\item The first item
\item The second item
\item The third item
\item The fourth item
\end{enumerate}
The `description` environment is slightly different. Each item takes the term being described as an option. The environment itself takes an option as well, which should be the longest term being described. This will set the indentation so the descriptions line up with each other.

**Example of Description**

\begin{description}
\item[First Item] Description of first item
\item[Second Item] Description of second item
\item[Third Item] Description of third item
\item[Fourth Item] Description of fourth item
\end{description}
As you can see, the terms are on the left and are correctly indented so that their descriptions line up. The terms are also assigned a different color to set them apart from the descriptions.

### Example of Description - Result

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Item</td>
<td>Description of first item</td>
</tr>
<tr>
<td>Second Item</td>
<td>Description of second item</td>
</tr>
<tr>
<td>Third Item</td>
<td>Description of third item</td>
</tr>
<tr>
<td>Fourth Item</td>
<td>Description of fourth item</td>
</tr>
</tbody>
</table>
Overlays

- 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.
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In Beamer, overlays control the order in which parts of the frame appear.
An easy way to implement an *overlay* is to place the \texttt{\pause} command between the parts you want to show up separately.

For example, you could separate three items like this:

\texttt{\textbf{Step 1:} Compute the maximal suffix of $w$ with respect to $\preceq_l$ (say $v$) and the maximal suffix of $w$ with respect to $\preceq_r$ (say $v'$).}  
\texttt{\pause}

\texttt{\textbf{Step 2:} Find words $u$, $u'$ such that $w = uv = u'v'$.}  
\texttt{\pause}

\texttt{\textbf{Step 3:} If $|v| \le |v'|$, then output $(u,v)$. Otherwise, output $(u',v')$.}
Step 1: Compute the maximal suffix of $w$ with respect to $\preceq_l$ (say $v$) and the maximal suffix of $w$ with respect to $\preceq_r$ (say $v'$).

Step 2: Find words $u, u'$ such that $w = uv = u'v'$.

Step 3: If $|v| \leq |v'|$, then output $(u, v)$. Otherwise, output $(u', v')$. 
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Step 2: Find words \( u, u' \) such that \( w = uv = u'v' \).

Step 3: If \( |v| \leq |v'| \), then output \((u, v)\). Otherwise, output \((u', v')\).
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Step 2: Find words \( u, u' \) such that \( w = uv = u'v' \).

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, \texttt{\textbackslash \pause} creates multiple separate slides. The first slide displays the information contained above the first \texttt{\pause}, the second slide displays the information down to the second \texttt{\pause}, and so on.
Overlay Specifications

- Overlay specifications are given in pointed brackets (⟨,⟩) and indicate which slide the corresponding information should appear on.
- The specification ⟨1−⟩ means “display from slide 1 on.” ⟨1−3⟩ means “display from slide 1 to slide 3.” ⟨−3, 5−6, 8−⟩ means “display on all slides except slides 4 and 7.”
- Here is an example:

\begin{itemize}
  \item ⟨1⟩ \textdollar abcadcabca\textdollar
  \item ⟨1−2⟩ \textdollar abcabcabca\textdollar
  \item ⟨1−2⟩ \textdollar accaccacca\textdollar
  \item ⟨1⟩ \textdollar bacabacab\textdollar
  \item ⟨1, 3⟩ \textdollar cacdacca\textdollar
  \item ⟨1−2⟩ \textdollar caccaccacc\textdollar
\end{itemize}
Overlay Specifications - Example

In this example, a multiple choice question is asked and only the correct answers will appear on the second and third slides.

Which of these words $u$ have $p(u) = 3$? What about $p(u) = 4$?

- $abcadcabca$
- $abcabcabca$
- $accaccacca$
- $bacabacaba$
- $cacdaccacc$
- $caccaccacc$
In this example, a multiple choice question is asked and only the correct answers will appear on the second and third slides.

Which of these words $u$ have $p(u) = 3$? What about $p(u) = 4$?

- $abcdcabca$
- $abcabcabca$
- $accaccacca$
- $bacabacaba$
- $cadcaccacc$
- $caccaccacc$
In this example, a multiple choice question is asked and only the correct answers will appear on the second and third slides.

Which of these words $u$ have $p(u) = 3$? What about $p(u) = 4$?

- $\text{abcadcabca}$
- $\text{abcabcabca}$
- $\text{accaccacca}$
- $\text{bacabacaba}$
- $\text{cacadaccacc}$
- $\text{caccaccacc}$
Overlay specifications can also be used to make certain text commands take effect at different times. For example, this code applies the \texttt{alert} command only on specified slides:

\textbf{Example Code}

\begin{verbatim}
\alert{Alert on all slides}
\alert<2>{Alert on slide 2}
\alert<3>{Alert on slide 3}
\alert<1,3>{Alert on slides 1 and 3}
\alert<-2,4>{Alert on slides 1, 2 and 4}
\end{verbatim}

\textbf{Note:} If you want each item of a list to appear in order, use the \texttt{[<+->] option. (i.e. \texttt{\begin{itemize}[<+->]} \texttt{) }}
Overlay Specifications - Example

Result of Code

- Alert on all slides
- Alert on slide 2
- Alert on slide 3
- Alert on slides 1 and 3
- Alert on slides 1, 2 and 4
Overlay Specifications - Example

Result of Code

Alert on all slides
Alert on slide 2
Alert on slide 3
Alert on slides 1 and 3
Alert on slides 1, 2 and 4
Overlay Specifications - Example

Result of Code

Alert on all slides
Alert on slide 2
Alert on slide 3
Alert on slides 1 and 3
Alert on slides 1, 2 and 4
Overlay Specifications - Example

Result of Code

Alert on all slides
Alert on slide 2
Alert on slide 3
Alert on slides 1 and 3
Alert on slides 1, 2 and 4
Overlay Specifications

Overlay specifications can be used with these commands to achieve the default effect:

\textbf<2>{Sample} \quad \textit<2>{Sample} \quad \textsl<2>{Sample} \quad \alert<2>{Sample} \quad \texttt<2>{Sample} \quad \textsf<2>{Sample} \quad \color<2>{green}\ Sample \quad \structure<2>{Sample}

<table>
<thead>
<tr>
<th>\textbf&lt;2&gt;{Sample}</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textit&lt;2&gt;{Sample}</td>
<td>Sample</td>
</tr>
<tr>
<td>\textsl&lt;2&gt;{Sample}</td>
<td>Sample</td>
</tr>
<tr>
<td>\alert&lt;2&gt;{Sample}</td>
<td>Sample</td>
</tr>
<tr>
<td>\texttt&lt;2&gt;{Sample}</td>
<td>Sample</td>
</tr>
<tr>
<td>\textsf&lt;2&gt;{Sample}</td>
<td>Sample</td>
</tr>
<tr>
<td>\color&lt;2&gt;{green}\ Sample</td>
<td>Sample</td>
</tr>
<tr>
<td>\structure&lt;2&gt;{Sample}</td>
<td>Sample</td>
</tr>
</tbody>
</table>

Note: The effect will only appear on the second slide.
## Overlay Specifications

Overlay specifications can be used with these commands to achieve the default effect:

<table>
<thead>
<tr>
<th>Command</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>\textbf&lt;2&gt;</code>{Sample}</td>
<td>Sample</td>
</tr>
<tr>
<td><code>\textit&lt;2&gt;</code>{Sample}</td>
<td>Sample</td>
</tr>
<tr>
<td><code>\textsl&lt;2&gt;</code>{Sample}</td>
<td>Sample</td>
</tr>
<tr>
<td><code>\alert&lt;2&gt;</code>{Sample}</td>
<td>Sample</td>
</tr>
<tr>
<td><code>\texttt&lt;2&gt;</code>{Sample}</td>
<td>Sample</td>
</tr>
<tr>
<td><code>\textsf&lt;2&gt;</code>{Sample}</td>
<td>Sample</td>
</tr>
<tr>
<td><code>\color&lt;2&gt;</code>{green} Sample</td>
<td>Sample</td>
</tr>
<tr>
<td><code>\structure&lt;2&gt;</code>{Sample}</td>
<td>Sample</td>
</tr>
</tbody>
</table>

**Note:** The effect will only appear on the second slide.
Some commands have special overlay specification effects:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>\onslide&lt;1,2&gt;</td>
<td>Text only appears on specified slides. If no text is given, any text following the command will only appear on the specified slides.</td>
</tr>
<tr>
<td>\only&lt;1,2&gt;</td>
<td>Text only appears on specified slides. When the text is hidden, it will occupy no space.</td>
</tr>
<tr>
<td>\visible&lt;1,2&gt;</td>
<td>Text appears on specified slides and is completely transparent, but still occupies space.</td>
</tr>
<tr>
<td>\invisible&lt;1,2&gt;</td>
<td>The opposite of visible.</td>
</tr>
</tbody>
</table>
## Overlay Specifications - Special Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>\alt&lt;1,2&gt;</code></td>
<td>Takes two arguments: one for the default text and a second for the alternate text. The default text shows up on the specified slides. The alternate text shows up on all unspecified slides.</td>
</tr>
<tr>
<td><code>\temporal&lt;1,2&gt;</code></td>
<td>Takes three arguments: one for the text that will appear if the current slide comes before the specified slides, a second for the text that appears while currently on the specified slides, and a third for the text that appears after the specified slides have appeared.</td>
</tr>
<tr>
<td><code>\uncover&lt;1,2&gt;</code></td>
<td>The text will only be &quot;uncovered&quot; on the specified slides. On other slides, the text will still be typeset and will appear transparent.</td>
</tr>
</tbody>
</table>
Overlay Specifications - Environments

Environments can also be overlay specification aware. For most environments, the entire environment will only appear on the specified slides.

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.

<table>
<thead>
<tr>
<th>Command</th>
<th>Corresponding Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>\only</td>
<td>onlyenv</td>
</tr>
<tr>
<td>\alt</td>
<td>altenv</td>
</tr>
<tr>
<td>\visible</td>
<td>visibleenv</td>
</tr>
<tr>
<td>\uncover</td>
<td>uncoverenv</td>
</tr>
<tr>
<td>\invisible</td>
<td>invisibleenv</td>
</tr>
</tbody>
</table>
Simple tables can be created in Beamer with the `tabular` environment. We will begin with a simple table and add more detail as we go along.

- Tables start with the command `\begin{tabular}{ccc}`.
- `{ccc}` tells us the number of columns as well as the alignment of each column. This table has three columns; each column is center aligned.
- Columns can be aligned to the left `{l}`, center `{c}`, or right `{r}`.
- Alignments can be mixed up. For example, `{lcrrr}`.
- Tables are constructed in rows. An `&` divides each cell and each row must end with `\`.
- `\end{tabular}` closes the table.
A typical Beamer table will start out like this:

Example Beamer Table

\begin{tabular}{ccc}
  cell 1 & cell 2 & cell 3 \\
  cell 4 & cell 5 & cell 6 \\
\end{tabular}
We can add \hline between rows to divide rows more clearly:

\begin{tabular}{ccc}
\hline
  cell 1 & cell 2 & cell 3 \\ 
\hline
  cell 4 & cell 5 & cell 6 \\ 
\hline
\end{tabular}
We can add a “|” between column indicators to divide columns more clearly:

**Example Beamer Table**

\begin{tabular}{|c|c|c|}
  cell 1 & cell 2 & cell 3 \\
  cell 4 & cell 5 & cell 6 \\
\end{tabular}
Use \textbf{and multiple} \hline commands to create a header:

**Example Beamer Table**

```
\begin{tabular}{c||c|c|c|}
  & \textbf{header 1} & \textbf{header 2} & \textbf{header 4} \\
\hline
\textbf{header 4} & cell 1 & cell 2 & cell 3 \\
\hline
\textbf{header 5} & cell 4 & cell 5 & cell 6 \\
\end{tabular}
```
Beamer provides many ways to *structure* your frames so they appear well organized and are easy for the audience to follow. This section will focus on:

- Columns
- Blocks
- Boxes (Borders)
Columns

The column environment is called as shown below:

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

where \textit{xx} is the percentage of the width of the slide.
Columns - Example

Here is a simple 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:

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

Introduction to \LaTeX

``Beamer is a \LaTeX class for creating presentations that are held using a projector...''
Other block environments are also available. Each environment can be used in place of block and has its own color scheme to keep your examples well organized.

### Other Block Environments

<table>
<thead>
<tr>
<th>Content Type</th>
<th>Corresponding Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic</td>
<td>block</td>
</tr>
<tr>
<td>Theorems</td>
<td>theorem</td>
</tr>
<tr>
<td>Lemmas</td>
<td>lemma</td>
</tr>
<tr>
<td>Proofs</td>
<td>proof</td>
</tr>
<tr>
<td>Corollaries</td>
<td>corollary</td>
</tr>
<tr>
<td>Examples</td>
<td>example</td>
</tr>
<tr>
<td>Hilighted Title</td>
<td>alertblock</td>
</tr>
</tbody>
</table>
Columns and Blocks

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

```
\begin{columns} [t]
  \column{.5\textwidth}
  \begin{block}{Column 1 Header}
    Column 1 Body Text
  \end{block}
  \column{.5\textwidth}
  \begin{block}{Column 2 Header}
    Column 2 Body Text
  \end{block}
\end{columns}
```

Gives us...
Columns and Blocks

<table>
<thead>
<tr>
<th>Column 1 Header</th>
<th>Column 2 Header</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1 Body Text</td>
<td>Column 2 Body Text</td>
</tr>
</tbody>
</table>

Notice that the `[t]` argument to the `columns` command top-aligned our blocks so they are vertically even as opposed to vertically centered on the slide.
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. Here are some examples:

**Text Border Examples**

- `\shadowbox{Sample Text}`
- `\fbox{Sample Text}`
- `\doublebox{Sample Text}`
- `\ovalbox{Sample Text}`
- `\Ovalbox{Sample Text}`
Including graphics in a \LaTeX{} presentation is fairly simple, although limited.

There are multiple packages with varying ease of use and graphic quality.

For this tutorial, we will use the \texttt{graphics} package. Be sure to add \texttt{\usepackage{graphics}} to the preamble of your \LaTeX{} file.

The \texttt{graphics} package supports the most common graphic formats \texttt{.pdf, .jpg, .jpeg, and .png}. Other formats must be converted to a supported format in an external editor.
A graphic can be added in the same way it is added in a LaTeX document by invoking the `\includegraphics` command.

Example Graphic

```
\includegraphics[height=3cm]{fractal.png}
```

![Fractal Image](fractal.png)
Themes can change the entire look and feel of your presentation. Different themes can be selected by using the \usetheme{} command with one of the following arguments:

- Antibes
- Boadilla
- Frankfurt
- Juanlespins
- Montpellier
- Singapore
- Bergen
- Copenhagen
- Goettingen
- Madrid
- Paloalto
- Warsaw
- Berkeley
- Darmstadt
- Hannover
- Malmoe
- Pittsburgh
- Warsaw
- Berlin
- Dresden
- Ilmenau
- Marburg
- Rochester
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{default} in the preamble of your .tex document and replace default with the theme of your choice:

albatross  
fly  
crane  
seagull  
beetle  
wolverine  
dove  
deaver
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{lily}
```

You can choose from:

lily  orchid  rose
Outer Color Themes

Outer 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:

\usecolorthemename{whale}

You can choose from:

whale  seahorse  dolphin
Outline

1. About Beamer
2. Templates
3. Frames
4. Sections and Subsections
5. Text
6. Alignment and Spacing
7. Lists
8. Overlays
9. Tables
10. Frame Structures
11. Graphics
12. Themes
13. Transitions
14. More Information
The PDF format offers a standardized way of defining transition effects from one slide to the next. For example, whatever was shown before the slide with the transition effect may dissolve to uncover the new slide.

These effects should be used *sparingly* as to not distract from the content of the presentation.

Be forewarned, different PDF viewers have different interpretations and levels of support for these effects.
A slide transition is composed of a single command. This command specifies which transitions should be used when the frame is displayed. We can include the \transboxin transition by placing the command anywhere in the affected frame.

**Transboxin Slide Transition**

\begin{frame}
\frametitle{Example of Transboxin}
\transboxin
\begin{itemize}
\item Frame Body Text
\end{itemize}
\end{frame}
Slide Transitions

- Slide transitions are overlay specification aware, so `\transboxin<2>` will cause the second slide of the frame to use the `\transboxin` effect.

- There are two possible options for each transition:
  - `duration=<seconds>` specifies the number of seconds the transitions effect needs.
  - `direction=<degree>` specifies the direction for directed effects.
The following transitions are available:

\transblindshorizontal
\transblindsvertical
\transboxin
\transboxout
\transdissolve
\transglitter
\transslipverticalin
\transslipverticalout
\transhorizontalin
\transhorizontalout
\transwipe
\transduration{2}

Horizontal blinds pulled away
Vertical blinds pulled away
Move to center from all sides
Move to all sides from center
Slowly dissolve what was shown before
Glitter sweeps in specified direction
Sweeps two vertical lines in
Sweeps two vertical lines out
Sweeps two horizontal lines in
Sweeps two horizontal lines out
Sweeps single line in specified direction
Show slide specified number of seconds
Outline

1. About Beamer
2. Templates
3. Frames
4. Sections and Subsections
5. Text
6. Alignment and Spacing
7. Lists
8. Overlays
9. Tables
10. Frame Structures
11. Graphics
12. Themes
13. Transitions
14. More Information
Thank you for taking the time to read through this \LaTeX Beamer tutorial. You should now have the basic knowledge you need to make elegant, professional-looking presentations.

If you have any questions regarding the contents of this tutorial or \LaTeX Beamer, please refer to the Beamer User Guide, which is included with the Beamer package, or follow this link: