How to make a presentation with LaTeX?

Introduction to Beamer

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Contents

Introduction to LaTeX

- LaTeX(pronounced /'lɑːtɛx/, /'lɑːtɛk/, /'leɪtɛx/, or /'leɪtɛk/) (Wikipedia) is a computer program for typesetting text and mathematical formulas.
- Uses commands to create mathematical symbols.
- Not a WYSIWYG program. It is a WYWIWYG (what you want is what you get) program!
- The document is written as a source file using a markup language.
- The final document is obtained by compiling the source file.

Advantages of Using LaTeX

- Professional typesetting: Best output.
- It is the standard for scientific documents.
- Processing mathematical (& other) symbols.
- Meaning based structuring (rather than appearance).
- Knowledgeable and helpful user group.
- Its FREE!
- Platform independent.

Installing LaTeX

- Linux:
  1. Install TeXLive from your package manager.
  2. Install a LaTeXeditor of your choice: TeXstudio, TexMaker, etc.
- Windows:
  1. Install MikTeX from http://miktex.org (this is the LaTeXcompiler).
  2. Install a LaTeXeditor of your choice: TeXstudio, TeXnicCenter, etc.
- Mac OS:
  1. Install MacTeX (this is the LaTeXcompiler for Mac).
  2. Install a LaTeXeditor of your choice.

Structure of a LaTeX Document

All latex documents have the following structure:

```
\documentclass[...]{...}
\usepackage{...}

\begin{document}
...
\end{document}
```

LaTeX Commands

- Always begin with a backslash \: \documentclass, \usepackage.
- Case sensitive.
- Consist of letters only.
- Some have parameters.
- Square brackets [ ] after the command name are for optional parameters.
- Curly braces { } after the command name are for required parameters

The Command: \documentclass

```
                                  article
                                  report
\documentclass[options]{          beamer   }
                                  book
                                  letter
                                  ...
```

- First line of all LaTeXdocuments.
- Specifies the type of the document:
  - article: Research paper.
  - report: Multi-chapter document.
  - book: For books.
  - letter: For letters.
- **[options]** can be used to set font size (10, 11, or 12 pt), set paper size, use one or two columns, etc.
- Most science publishers (Springer, Elsevier, IEEE, ACM etc.) have their own document classes. These are predefined classes.

Packages

```
\usepackage{package}
```

- Packages add new features and commands to LaTeX.
- Common packages:
  - amsmath, amssymb: for math symbols.
  - graphicx: for including graphics and images.
- Can also define new commands in the preamble, specify page numbering, etc.

Input the Text

The body of the text is written after the \begin{document} command:

```
\begin{document}
Enter the document content here
\end{document}
```

Remark

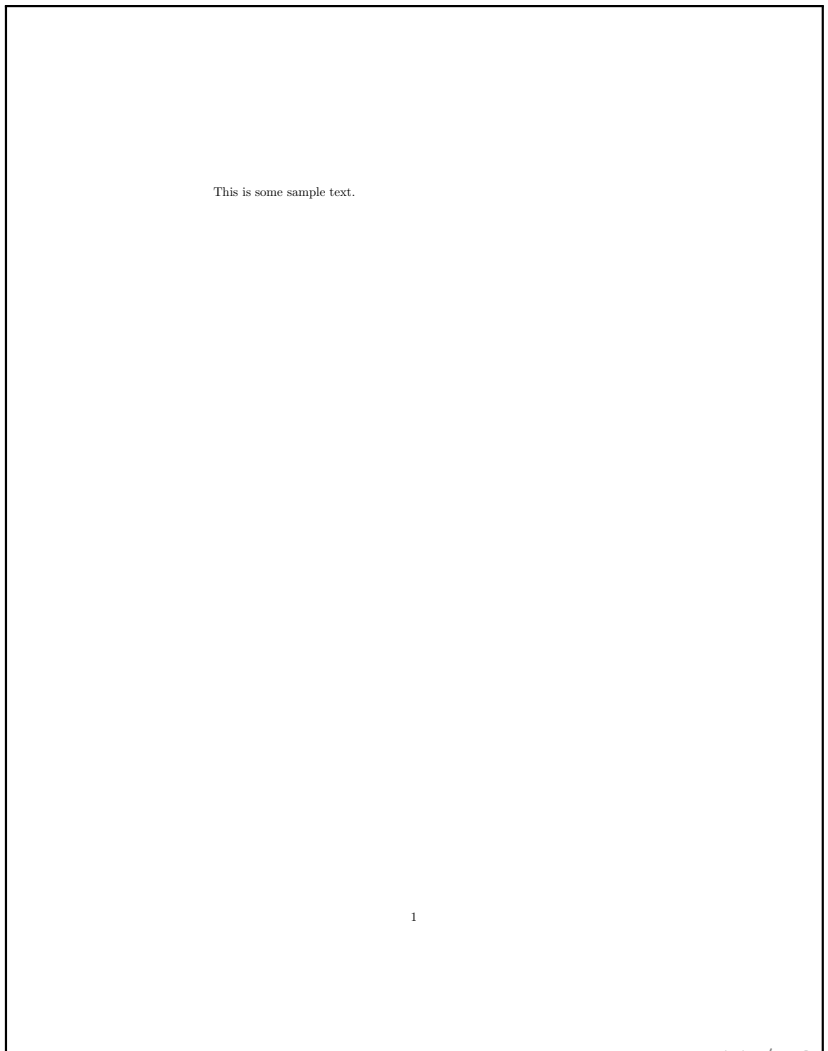
\begin{...} commands always need to be followed (eventually) by \end{...} commands.

A Simple LaTeX Document

The following is a very basic LaTeX document:

```
\documentclass{article}
\usepackage{graphicx}
\begin{document}
        This is some
            sample text.
\end{document}
```

This gives the following output:



Sections of a Paper

First thing: you have to indicate the title and the author(s) of the paper:

```
\title{title}
\author{authors}
\date{date}
\maketitle
```

Remark

Without \maketitle, the title and authors do not appear in the output.

Example

```
\title{The Theory of Relativity}
\author{Albert Einstein}
\date{01/01/1926}
\maketitle
```

Sections of a Paper


```
\thanks{...}
\begin{abstract} .... \end{abstract}
\begin{keywords} ... \end{keywords}
```

\thanks creates a footnote with whatever is in the braces.
Usually used after authors' names for academic information

Example

```
\thanks{I want to thank the University of Princeton
    for supporting this work.}
\begin{abstract}
In this paper, I introduce a new theory to explain
    how time and space are related.
\end{abstract}
\begin{keywords} Relativity; space; time \end{
    keywords}
```

A Simple LaTeX Document

The following is a sample LaTeX document:

```
\documentclass{article}
\usepackage{graphics,amsmath,amssymb}
\begin{document}
\title{The Theory of Relativity}
\author{Albert Einstien}
\date{01/01/1926}
\maketitle
\begin{abstract}
In this paper, I introduce a new theory to explain
    ...
\end{abstract}
\section{Introduction}
What is time and space?...
\section{The Theory}
Time and space are linked...
\subsection{Proof}
This the proof to my theory
\end{document}
```

Sections

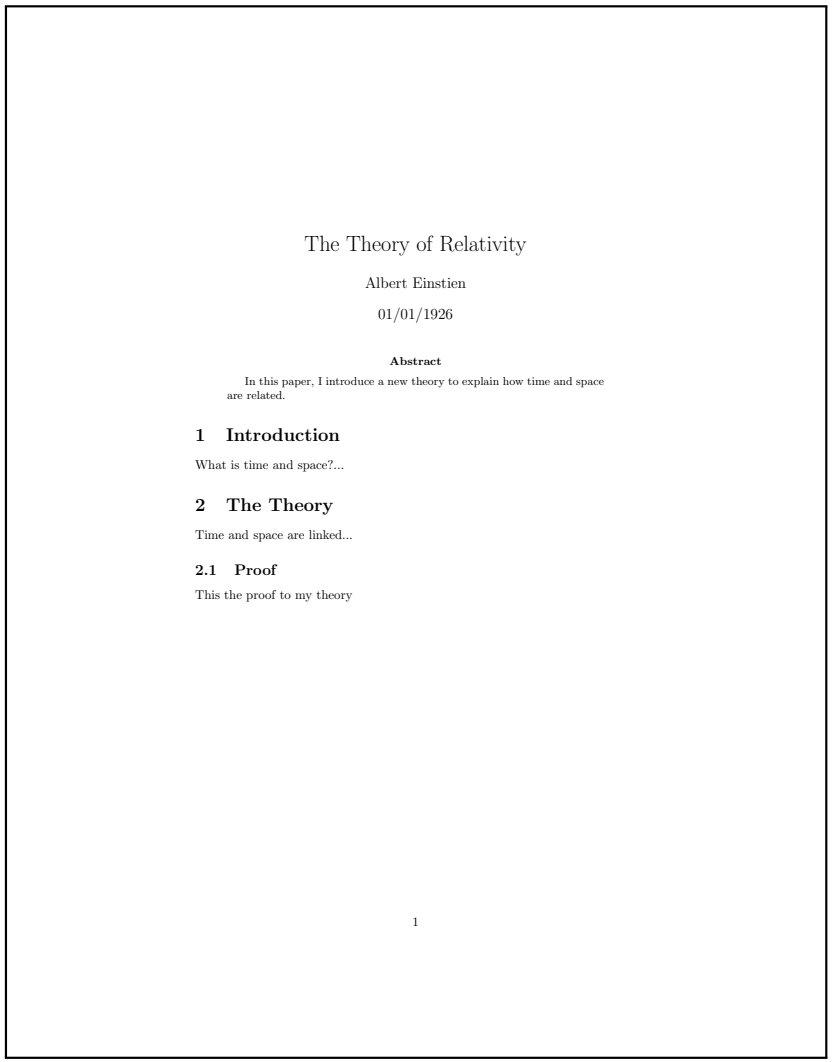
The document should be divided into sections, subsections, etc. Important commands:

```
\section{Title of first section}
...
\subsection{...}
...
\section{Title of second section}
...
\subsection{...}
...
\subsubsection{...}
...
```

LaTeXformates the section titles and numbers them according to the document class being used.

A Simple LaTeX Document

This gives the following output:



The Theory of Relativity

Albert Einstien

01/01/1926

Abstract

In this paper, I introduce a new theory to explain how time and space are related.

1 Introduction

What is time and space?...

2 The Theory

Time and space are linked...

2.1 Proof

This the proof to my theory

1

Cross-referencing

Cross references can be made using the commands \label and \ref.

Example

```
\section{Introduction}
\label{sec:intro}
This is the introduction ...
\section{Conclusion}
As mentioned in Section \ref{sec:intro}, we have ...
```

- LaTeXupdates the references automatically.
- It is possible to use any identifier as a label.
- It is custom to use the prefixes: sec:xxx for section labels, fig:xxx for figure labels, chap:xxx for chapter labels, tab:xxx for table labels, eq:xxx for equation labels.

Inserting Tables

To include tables, you must use the following commands.

Example

```
Table \ref{table_example}
     shows a table.
\begin{table}
\caption{An Example of a
    Table}
\label{table_example}
\centering
\begin{tabular}{|c|c|}
\hline  Student & Grade
    \\
\hline  12 & 13 \\
\hline
\end{tabular}
\end{table}
```

Table 1 shows a table.

Table : An Example of a Table

Student	Grade
12	13

Inserting Images

To include images, you must use a graphics package. The most common is *graphicx*.

Example

```
Figure \ref{fig:monalisa}
    shows the painting.

\begin{figure}
\centering % To center
    the image
\includegraphics[width
    =2.5cm]{monalisa.jpg}
    % Path and file name
\caption{The Monalisa}
\label{fig:monalisa}
\end{figure}
```

Figure 1 shows the painting.

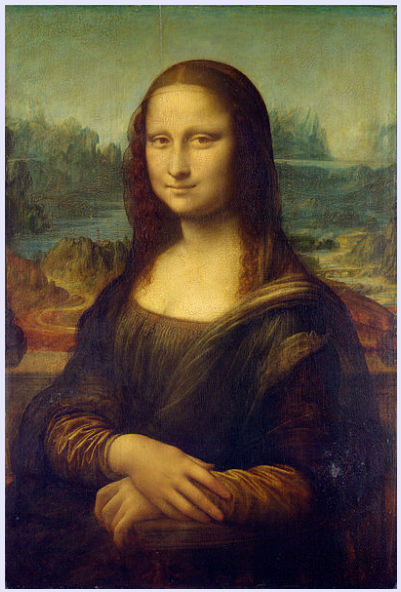


Figure : The Monalisa

Inserting Images

In general, a figure is included using:

```
\begin{figure}[options]
\centering
\includegraphics[options]{file name}
\caption{Figure title}
\label{label}
\end{figure}
```

- In *\begin{figure}[options]*, you can specify the position option:
  1. t: top of page.
  2. h: here.
  3. !: let the compiler decide.
  4. Any combination can be used.
- The compiler tries its best to fulfill your wish, but not necessarily.
- In *\includegraphics[options]*, you can specify the height, the width, the angle of rotation of the image.

Typesetting Mathematical Equations

- Latex is extremely good at typesetting math equations.
- Equations are written as text.
- Inline equations (equations within the text) are written between $ and $.

Example

Code:

```
Assume that $ \alpha x +  \beta y =1$, then
```

Output:

Assume that $\alpha x + \beta y = 1$, then

Typesetting Mathematical Equations

- Equations on a separate line are enclosed between \[and \].

Example

Code:

```
Assume that:
\[
\alpha x + \beta y =1,
\]
then ...
```

Output:

Assume that:

$$\alpha x + \beta y = 1,$$

then ...

Typesetting Mathematical Equations

- Numbered equations are written within the *equation* environment.

Example

Code:

```
Assume that:
\begin{equation}
\label{eq:my-equation} % <= The equation label
\alpha x + \beta y =1,
\end{equation}
then ...
```

Output:

Assume that:

$$\alpha x + \beta y = 1, \tag{1}$$

then ...

Typesetting Mathematical Equations

- To refer a numbered equation, use the command \eqref. The equation numbers are updated automatically.

Example

Code:

```
By using Equation \eqref{eq:my-equation}, we
    obtain:...

\begin{equation}
\label{eq:my-equation2}
\alpha x= 1- \beta y.
\end{equation}
```

Output:

By using Equation (1), we obtain:

$$\alpha x = 1 - \beta y. \tag{2}$$

Using Graphical Equation Editors

- The best way to write an equation is to write it directly as text: it is faster and you have more control.
- You can, however, use some graphical editors to help you write the equations until you master LaTeX.
- Some LaTeX editors (like TexStudio) offer some tool-bars with buttons that can help you write math symbols or even draw the math symbols (like the Math wizard in TexStudio).
- There are also online LaTeX equation editors, for example: http://www.codecogs.com/latex/eqneditor.php.

Introduction to Beamer?

- Beamer is a flexible LaTeXclass for making slides and presentations.
- It supports functionality for making PDF slides complete with colors, themes, transitions, overlays, etc.
- Adds a couple new features to the commands already you know about LaTeX.
- This presentation was made using the Beamer class.

Why using LaTeXfor presentations?

- Professional slides.
- Processing mathematical (& other) symbols.
- You care about the content and not about how the slides look.
- A lot of templates are available for download.
- Free.
- A lot of help.
- Easy to prepare handouts.

Installing the package Beamer

If you want to prepare a presentation using LaTeX, you need to use Beamer package.

- Linux: Under Debian or Ubuntu, you can type the following command: **apt-get install latex-beamer**
- Windows: Click the MikTex in your Windows "start menu" and then Maintenance. Then click on Package manager, look for Beamer and install it. You can also dowload it from here: **https://bitbucket.org/rivanvx/beamer/downloads**
- Mac OS: Already installed in MacTex

Structure of a LaTeXpresentation

All latex presentations using Beamer have the following structure:

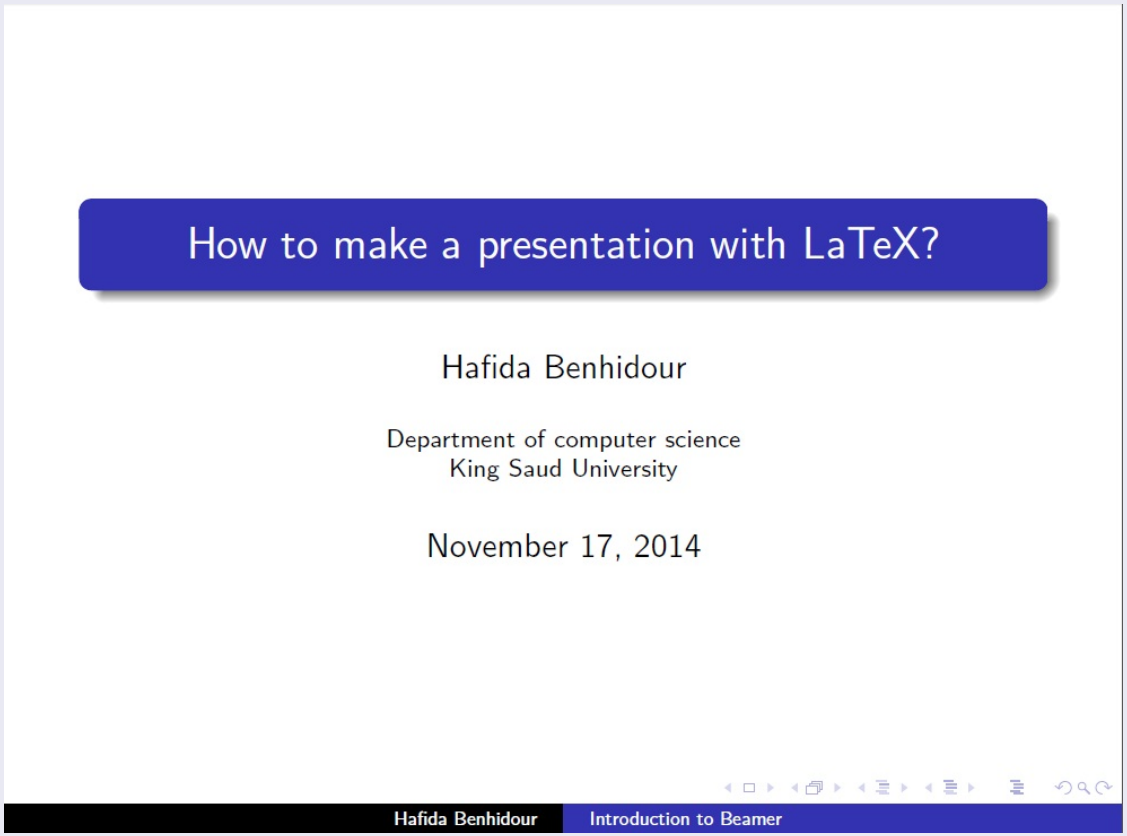
```
\documentclass{beamer}
\usepackage{graphicx} %include your packages here
\usetheme{Warsaw} %choose a theme:default,Antibes,
    Warsaw...
\title[Introduction to Beamer]{How to make a
    presentation with LaTeX?}
\author{Hafida Benhidour}
\institute[Hafida Benhidour]{Department of computer
    science\\King Saud University}
\date{November 17, 2014}
\begin{document}

%Insert the slides here
.....
\end{document}
```

How to add the title slide?


```
\documentclass{beamer}
\usepackage{graphicx}
\usetheme{Warsaw}
\title[Introduction to Beamer]{How to make a
    presentation with LaTeX?}
\author{Hafida Benhidour}
\institute[KSU]{Department of computer science\\King
    Saud University}
\date{November 17, 2014}
\begin{document}
%Insert the first slide containing the title of the
    presentation
\begin{frame}
\titlepage
\end{frame}
.....
\end{document}
```

How to add the title slide?

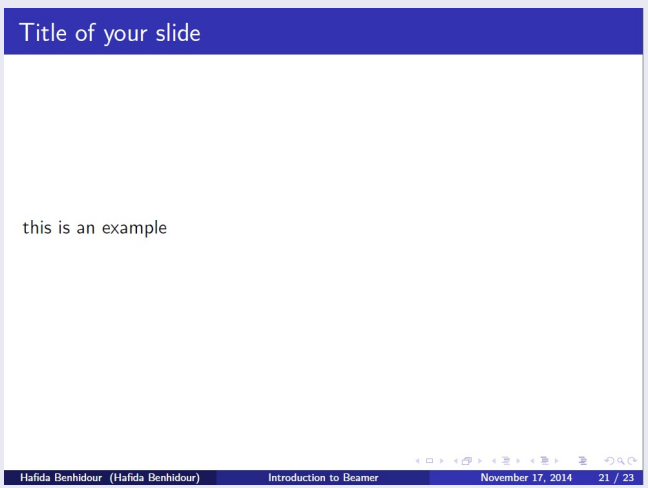
Output



How to add a slide?


```
....
\begin{frame}{Title of your slide}
this is an example
\end{frame}
...
```

Output



How to add a bulleted list?

Add a list environment between the command \begin{frame} followed by the title of the slide and the command \end{frame}.

```
\begin{itemize}
\item This is the first point
\item This is the second point
\end{itemize}
```

Output

- This is the first point
- This is the second point

How to animate a bulleted list?

Add \pause before each item.

```
\begin{itemize}
\pause
\item This is the first point
\pause
\item This is the second point
\end{itemize}
```

Output

How to animate a bulleted list?

Add \pause before each item.

```
\begin{itemize}
\pause
\item This is the first point
\pause
\item This is the second point
\end{itemize}
```

Output

- This is the first point

How to animate a bulleted list?

Add \pause before each item.

```
\begin{itemize}
\pause
\item This is the first point
\pause
\item This is the second point
\end{itemize}
```

Output

- This is the first point
- This is the second point

How to add a numbered list?

Add a list environment between the command \begin{frame} followed by the title of the slide and the command \end{frame}.

```
\begin{enumerate}
\item This is the first point
\item This is the second point
\end{enumerate}
```

Output

1. This is the first point
2. This is the second point

How to animate a numbered list?

Add \pause before each item.

```
\begin{enumerate}
\pause
\item This is the first point
\pause
\item This is the second point
\end{enumerate}
```

Output

How to animate a numbered list?

Add \pause before each item.

```
\begin{enumerate}
\pause
\item This is the first point
\pause
\item This is the second point
\end{enumerate}
```

Output

1. This is the first point

How to animate a numbered list?

Add \pause before each item.

```
\begin{enumerate}
\pause
\item This is the first point
\pause
\item This is the second point
\end{enumerate}
```

Output

1. This is the first point
2. This is the second point

Another way to create pauses

This method works for both bulleted and numbered lists.

```
\begin{itemize}
\item<3-> This is the first point
\item<2-> This is the second point
\item<1-> This is the third point
\end{itemize}
```

Output

- This is the third point

Another way to create pauses

This method works for both bulleted and numbered lists.

```
\begin{itemize}
\item<3-> This is the first point
\item<2-> This is the second point
\item<1-> This is the third point
\end{itemize}
```

Output

- This is the second point
- This is the third point

Another way to create pauses

This method works for both bulleted and numbered lists.

```
\begin{itemize}
\item<3-> This is the first point
\item<2-> This is the second point
\item<1-> This is the third point
\end{itemize}
```

Output

- This is the first point
- This is the second point
- This is the third point

How to add a text area?

Useful if you need to add a definition for example.

```
\begin{block}{Definition}
Write the definition here.
\end{block}
```

Definition

Write the definition here.

Dividing the slide into two parts

Good for displaying a text on one side and a picture on the other.

Here is the displayed equation:

$$f(x) = 2x^3 - 7x + 3$$

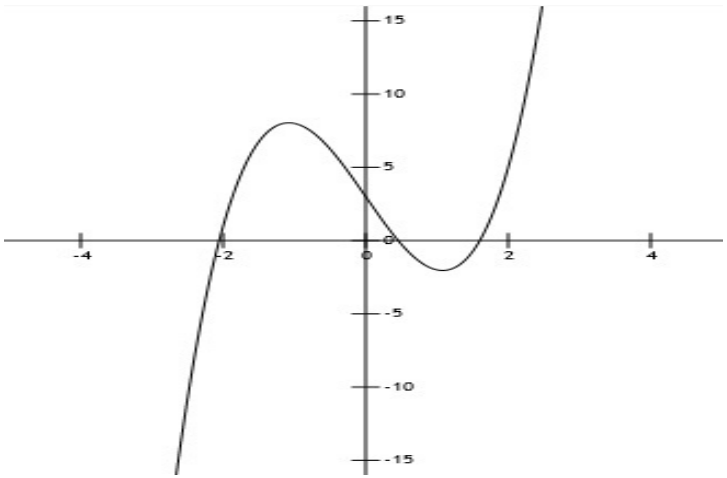


Figure : Equation plot

Dividing the slide into two parts

Use \begin{columns} with corresponding end for the columns environment. Use \begin{column} with corresponding end to make the individual columns.

```
\begin{frame}{Dividing the slide into two parts}
\begin{columns}
\begin{column}{0.5\textwidth}
Here is the displayed equation: \[f(x)=2x^3-7x+3\]
\end{column}
\begin{column}{0.5\textwidth}
\begin{figure}
\includegraphics[width=0.7\linewidth,height=3cm]{./
    equaplot}
\caption{Equation plot}
\end{figure}
\end{column}
\end{columns}
\end{frame}
```

Handouts

How to make a presentation with LaTeX?
Introduction to Beamer

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November 17, 2014

Contents

Introduction to LaTeX

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- Uses commands to create mathematical symbols.
- Not a WYSIWYG program. It is a WYWIWYG (what you want is what you get) program!
- The document is written as a source file using a markup language (like HTML).
- The final document is obtained by compiling the source file.

Advantages of Using LaTeX

- Professional typesetting: Best output.
- It is the standard for scientific documents.
- Processing mathematical (& other) symbols.
- Meaning based structuring (rather than appearance).
- Knowledgeable and helpful user group.
- Its FREE!
- Platform independent.

Handouts

In the beginning of your latex document add the handout option and use the theme **default**.
To print several pages use the package **pgfpages**.

```
\documentclass[handout]{beamer}
\usetheme{default}
\usepackage{pgfpages}
\pgfpagesuselayout{4 on 1}[border shrink=2mm]
```

Help

- Forums.
- en.wikibooks.org, search for the command that you do not know how to use it, you will find a lot of examples.
- A brief description on how to install LaTeXand this presentation are available on my homepage http://fac.ksu.edu.sa/hbenhidour