



برنامج مهارات البحث العلمي التاسع

# How to make a presentation with L<sup>A</sup>T<sub>E</sub>X?

## Introduction to Beamer

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# Contents

Introduction to  $\text{\LaTeX}$

Introduction to Beamer

# Introduction to L<sup>A</sup>T<sub>E</sub>X

- ▶ L<sup>A</sup>T<sub>E</sub>X 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 converting the source file (.tex file) into a pdf file.

# Advantages of Using L<sup>A</sup>T<sub>E</sub>X

- ▶ Professional typesetting: best output.
- ▶ It is the standard for scientific documents.
- ▶ Processing mathematical (& other) symbols.
- ▶ Knowledgeable and helpful user group.
- ▶ Its FREE!
- ▶ Platform independent.

# Installing L<sup>A</sup>T<sub>E</sub>X

- ▶ Linux:
  1. Install TeXLive from your package manager.
  2. Install a L<sup>A</sup>T<sub>E</sub>X editor of your choice: TeXstudio, TexMaker, etc.
- ▶ Windows:
  1. Install MikTeX from <http://miktex.org> (this is the L<sup>A</sup>T<sub>E</sub>X compiler).
  2. Install a L<sup>A</sup>T<sub>E</sub>X editor of your choice: TeXstudio, TeXnicCenter, etc.
- ▶ Mac OS:
  1. Install MacTeX (this is the L<sup>A</sup>T<sub>E</sub>X compiler for Mac).
  2. Install a L<sup>A</sup>T<sub>E</sub>X editor of your choice.

# TeXstudio

The screenshot displays the TeXstudio interface with a LaTeX document open. The document content is as follows:

```
\usepackage{graphics,amsmath,amssymb}
\begin{document}
\title{The Theory of Relativity}
\author{Albert Einstein}
\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}
\end{listlisting}
\end{frame}

\begin{frame}[fragile]{A Simple \LaTeX Document}
Converting the (.tex) file to obtain the pdf file
\begin{figure}
\centering
\fbbox{\includegraphics[height=6.5cm]{sample.pdf}}
\end{figure}
\end{frame}
```

The presentation slide on the right is titled "Installing L<sup>A</sup>T<sub>E</sub>X" and contains the following content:

## Installing L<sup>A</sup>T<sub>E</sub>X

- Linux:
  - 1 Install TeXLive from your package manager.
  - 2 Install a L<sup>A</sup>T<sub>E</sub>X editor of your choice: TeXstudio, TexMaker, etc.
- Windows:
  - 1 Install MikTeX from <http://miktex.org> (this is the L<sup>A</sup>T<sub>E</sub>X compiler).
  - 2 Install a L<sup>A</sup>T<sub>E</sub>X editor of your choice: TeXstudio, TeXnicCenter, etc.
- Mac OS:
  - 1 Install MacTeX (this is the L<sup>A</sup>T<sub>E</sub>X compiler for Mac).
  - 2 Install a L<sup>A</sup>T<sub>E</sub>X editor of your choice.

## Structure of a L<sup>A</sup>T<sub>E</sub>X Document

All latex documents have the following structure:

# Structure of a $\text{\LaTeX}$ Document

All latex documents have the following structure:

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

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

- ▶ Commands always begin with a backslash  $\backslash$ :  
 $\backslash$ **documentclass**,  $\backslash$ **usepackage**.
- ▶ Commands are case sensitive and consist of letters only.
- ▶ Some commands 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`

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

- ▶ First line of all  $\text{\LaTeX}$  documents.
- ▶ Specifies the type of the document:
  - ▶ article (research paper), report (multi-chapter document), book (for books), beamer (for presentations).
- ▶ **[options]** can be used to set font size (10, 11, or 12 pt), set paper size, use one or two columns, etc.

```
\documentclass[12pt , a4paper , twocolumn]{ article }
```

- ▶ Most 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.

```
\documentclass{report}  
\usepackage{color}  
\usepackage{graphicx}  
  
\begin{document}  
...  
\end{document}
```

# 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

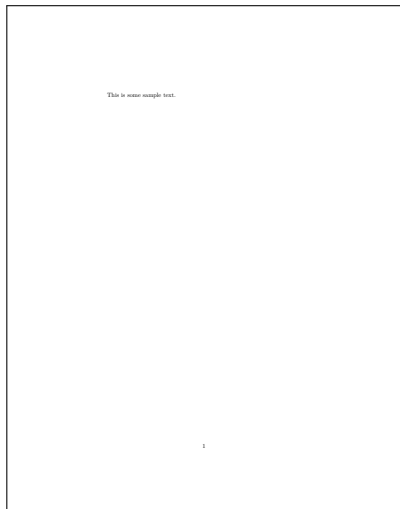
`\begin{...}` commands always need to be followed (eventually) by `\end{...}` commands.

# A Simple L<sup>A</sup>T<sub>E</sub>X Document

The following is a very basic L<sup>A</sup>T<sub>E</sub>X 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}
```

# Sections

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

```
\section{Title of first section}  
...  
\subsection{Title of the sub-section}  
...  
\section{Title of second section}  
...  
\subsection {...}  
...  
\subsection {...}  
...
```

$\LaTeX$  formats the section titles and numbers them according to the document class being used.

# A Simple L<sup>A</sup>T<sub>E</sub>X Document

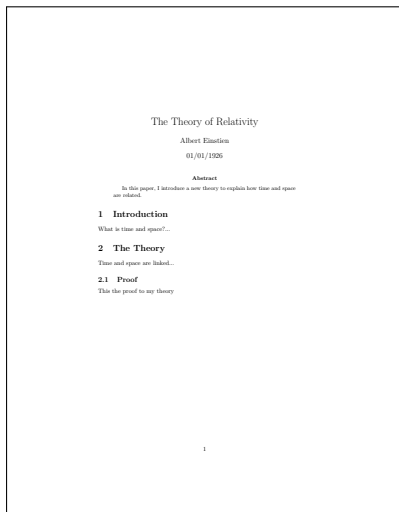
The following is a sample of a L<sup>A</sup>T<sub>E</sub>X document (.tex file):

```
\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}
```



# A Simple L<sup>A</sup>T<sub>E</sub>X Document

Converting the (.tex) file to obtain the pdf file:



# 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 ...
```

- ▶  $\LaTeX$  updates 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.

```
\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 \ref{table_example}
shows a table.
```

**Table:** An Example of a Table

Student	Grade
12	13

The results of the experiments are shown in Table 1.

# Inserting Images

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

```
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.

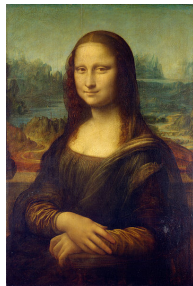


Figure: The Monalisa

# 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

### Tex document:

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

### Pdf document:

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

# Typesetting Mathematical Equations

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

## Example

### Tex document:

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

### Pdf document:

Assume that:

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

then ...

# Typesetting Mathematical Equations

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

## Example

### Tex document:

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

### Pdf document:

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

### Tex document:

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

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

### Pdf document:

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>.

# How to make slides using L<sup>A</sup>T<sub>E</sub>X

Beamer

# Introduction to Beamer?

- ▶ Beamer is a flexible  $\text{\LaTeX}$ class 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  $\text{\LaTeX}$ .
- ▶ This presentation was made using the Beamer class.

# Why using $\text{\LaTeX}$ for 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 search for Package manager, look for Beamer and install it. You can also download it from here:  
**<https://bitbucket.org/rivanvx/beamer/downloads>**
- ▶ Mac OS: Already installed in MacTex

# Structure of a $\text{\LaTeX}$ presentation

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 make a presentation with LaTeX?

Hafida Benhidour

Department of computer science  
King Saud University

November 17, 2014

Navigation icons: back, forward, search, etc.

Hafida Benhidour Introduction to Beamer

# 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

- ▶ 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

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 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:

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

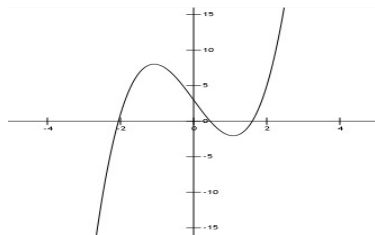


Figure: Equation plot

## 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}
```

## How to make a presentation with $\LaTeX$ ? Introduction to Beamer

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Department of computer science  
King Saud University

November 17, 2014

## Contents

Introduction to  $\LaTeX$

Introduction to Beamer

## Introduction to $\LaTeX$

- ▶ LaTeX 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 (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](https://en.wikibooks.org), search for the command that you do not know how to use it, you will find a lot of examples.