

Latex

- **LaTeX** is pronounced as '*lah-tech*' or '*lay-tech*.' which is distributed under the LPPL (Latex Project Public License).
- It is based on TEX, a typesetting language designed for science and math.
- Both **LATEX** and **TEX** contain a variety of font styles, such as serif, typewriter, and a set of mathematical functions.
- It is an open-source and powerful document preparation system.
- The **Latex system** handles the layout and formatting of the structures using familiar concepts of the section, table, figure, chapter, etc.

Features of Latex

- Latex is a markup language and free license software. It includes a set of built-in commands.
- It is a mode of mathematical and special symbols.
- LaTeX is generally distributed along with plain **TEX**, i.e., it provides a set of macros for TEX to interpret.
- The other macros for TEX are Plain TEX, GNU Texinfo, etc.
- LaTeX is not compatible with the GNU (General Public License).
- It is available on most of the operating systems like UNIX, BSD, Linux, Windows, DOS, etc.

Basic Document Structure

- The format of a document is pretty simple.
 - In the preamble
 - Documentclass
 - Packages
 - In the front matter
 - Title/author
 - In the body
 - Contents
 - In the back matter
 - bibliography

In the Preamble

- You specify our document class.
 - Document classes: letter, article, report, book, slides(beamer, prosper)
 - `\documentclass[12pt]{article}`
 - Backslash – at the beginning of text markup command
- Packages: numerous packages are available
 - `\usepackage[margin=1in]{geometry}`
 - `\usepackage{setspace}`
 - `\usepackage{harvard}`

Latex First Document

```
\documentclass{article}
```

```
\begin{document}
```

First document. This is a simple example, with
no

extra parameters or packages included.

```
\end{document}
```

Explanation

- The first line of code, `\documentclass{article}`, declares the document type known as its class. which controls the overall appearance of the document. Different types of documents require different classes.
- Having set the document class, our content, known as the body of the document, is written between the `\begin{document}` and `\end{document}` tags.

Preamble of a Document

- The preamble allows you to define the type of document, author, date, language, and load in LaTeX packages that you want to use in the document.
- After we have included a preamble, we can go ahead and start the main text of our document. We can add things like a title, abstract, and table of contents

A minimal document preamble might look like this:

```
\documentclass[12pt, letterpaper]{article}  
\usepackage{graphicx}
```

where `\documentclass[12pt, letterpaper]{article}` defines the overall class (type) of document.

Preamble of a Document

In this example, the two parameters do the following:

12pt sets the font size

letterpaper sets the paper size

Of course other font sizes, 9pt, 11pt, 12pt, can be used, but if none is specified, the default size is 10pt. As for the paper size, other possible values are a4paper and legalpaper.

The preamble line

```
\usepackage{graphicx}
```

is an example of loading an external package (here, graphicx) to extend LaTeX's capabilities, enabling it to import external graphics files

Explanation about Formatting

- `\` it is called backslash, used as the starting command. The line following it gets printed.
- `{}` it is called curly brackets, which is used to group and separate commands from its surroundings and must appear in pairs.
- `\` terminates a line.
- `*` it also terminates the line, but disallows the page break.
- `[]` it is used to write the optional parameters that can be passed to a command to change its behavior.
- `%` the Latex ignores the rest of the line or commands after %.

Including title, author and date information

`\title{My first LaTeX document}`: the document title

`\author{Hubert Farnsworth}`: here you write the name of the author(s) and, optionally, the `\thanks` command within the curly braces:

`\thanks{Funded by the Overleaf team.}`: can be added after the name of the author, inside the braces of the author command. It will add a superscript and a footnote with the text inside the braces. Useful if you need to thank an institution in your article.

`\date{August 2022}`: you can enter the date manually or use the command `\today` to typeset the current date every time the document is compiled

With these lines added, our preamble should look something like this:

```
\documentclass[12pt, letterpaper]{article}  
  
\title{My first LaTeX document}  
  
\author{Hubert Farnsworth\thanks{ICAR-IISR.}}  
  
\date{August 2024}
```

Adding comments

```
\documentclass[12pt, letterpaper]{article}  
\begin{document}We have now added a title, author and date to  
our first \LaTeX{} document!  
% This line here is a comment. It will not be typeset in the  
document.  
\end{document}
```

Bold, italics and underlining

```
\documentclass[12pt, letterpaper]{article}  
\begin{document}
```

{center} is used to align the text to the center.

\textbf is used to display the text in bold.
{large} is a type of font size.

```
\end{document}
```

Text Alignment

```
\documentclass{article}
\begin{document}
% Left-aligned text
\begin{flushleft}
This is left-aligned text in LaTeX. \\
It aligns all lines to the left margin.
\end{flushleft}
% Right-aligned text
\begin{flushright}
This is right-aligned text in LaTeX. \\
It aligns all lines to the right margin.
\end{flushright}
% Justified (default) text
\begin{justify}
This is justified text in LaTeX. \\
It aligns text evenly along both the left and
right margins, adding extra space between
words as necessary.
\end{justify}
\end{document}
```



Adding Image

```
\documentclass{article}  
\usepackage{graphicx}% LaTeX package to import  
graphics  
\graphicspath{{images/}} % configuring the  
graphicx package
```

```
\begin{document}
```

The universe is immense and it seems to be
homogeneous,
on a large scale, everywhere we look.

```
\includegraphics{images/Latex.JPG}
```

There's a picture of a galaxy above.

```
\end{document}
```

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