

Introduction to \LaTeX

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1 Things You Need to Know

TeX is a computer program created by Donald E. Knuth. Main purpose of the TeX is to typeset and write mathematical formulas with ease.

\LaTeX built on the TeX language it further improves typesetting abilities by introducing predefined layout and macros. \LaTeX originally created by Leslie Lamport.

\LaTeX assumes the role of the book designer.

1.1 \LaTeX Input Files

- \LaTeX files are simply text files containing instructions to how to structure to the document
- A \LaTeX file ends with a .tex

1.1.1 Spaces

- Whitespace characters such as blank spaces, tabs are treated uniformly as "space" by \LaTeX
- Several consecutive white space characters are treated as one "space".
- Beginning of the line with a white space is ignored and single new line simply treated as a white space
- To instruct \LaTeX to create a new line use " \backslash "
- An Empty line between two lines of text defines the end of a paragraph.
- More than one empty line treated as a line break.

1.1.2 Special Characters

- Followings are the special characters in \LaTeX
 - #, \$, ^, &, _, {, }, ~, \
- These special characters have special meaning to \LaTeX
- These can be escaped by prefixing them with \
- To use backslash as literally use `\textbackslash`

1.1.3 \LaTeX Commands

- \LaTeX commands are case sensitive. They start with a backslash.
- \LaTeX commands are terminated by a space, a number or any other "non-letter"
- Many \LaTeX commands have starred variant.
- \LaTeX ignores whitespace after commands. To force a white space you can use empty parenthesis "{}"
- Some commands require a parameters, which has to be given between curly braces.
- Some commands take optional parameters, which are inserted after the command name in square brackets
- A \LaTeX command usually take the form;
`\command[optional parameters]{parameters}`

1.1.4 Comments

- % symbol signifies a comment
- \LaTeX compiler ignores anything when it encounters % symbol until the end of the line.
- for multiline comments use `\comment` environment by importing verbatim package.

1.1.5 File Structure

- \LaTeX expects a certain structure to process the file.
- Every file should start with a `\documentclass{}` command!
- To load a package use `\usepackage{}` packages provide new features to your document.

- To start writing the document use `\begin{document}` and to end it use `\end{document}`
- Anything comes before `\begin{document}` and after the `\documentclass{}` is the preamble.

1.1.6 Layout of the Document

- Type of document is specified with `\documentclass[options]{class}` command.
- List of classes;
 - article: for articles in scientific journals
 - proc: a class for proceedings.
 - report: for longer reports containing several chapters, small books.
 - books: for real books.
 - slides: for slides.
- List of optional parameters;
 - 10pt, 11pt, 12pt sets the font size.
 - a4paper, letterpaper defines the paper size.
 - fleqn Typesets displayed formulae left-aligned instead of centered.
 - onecolumn, twocolumn specifies column format.
 - twoside, oneside specifies whether double or single sided output should be generated.

1.2 Packages

- If you want to extent your document with graphics, mathematical formulas you will probably need to use packages.
- Packages are activated with `\usepackage[options]{package}`
- Package command are written inside of the preamble section of your source code.
- If you use any of the linux distributions you can invoke `$ texdoc packagename` command to see documentation of the package

1.3 Page Styles

- \LaTeX supports three predefined header/footer combinations –so called page styles.
- `\pagestyle{style}` command tells which page style to use.
- If you intent to be more specific you can use `\thispagestyle{style}` it only applies to page corresponding to the command.

1.4 Files You May Encounter

- Some packages are so essential they are distributed with L^AT_EX
- Here is a brief description of each one of them;
 - doc: Allows to documentation of L^AT_EX programs.
 - exscale: Provides a scaled versions of the math extension font.
 - fontenc: Specifies which font encoding L^AT_EX should use.
 - ifthen: Provides commands of the form "if...then do...otherwise do...."
 - latexsym: To access the L^AT_EX symbol font, you should use latexsym package.
 - makeidx: Provides commands for producing indexes.
 - syntonly: Processes a document without a typesetting it.
 - inputenc: Allows the specification of input encoding such as utf8.
- Here is a brief description of each page styles;
 - plain: prints the page numbers on bottom of the page, in middle of the footer. This is the default page style.
 - headings: prints the current chapter heading and the page number in the header on each page, while footer remains empty.
 - empty: sets both the header and the footer to be empty.
- When you work with L^AT_EX you will encounter handful of intermediate files with different extension.
Here is a brief description of each one of them;
 - .tex: L^AT_EX and T_EX input file. Can be compiled with latex command.
 - .sty: L^AT_EX macro package. Load this into your L^AT_EX document using `\usepackage` command
 - .dtx: L^AT_EX Documented T_EX. This is the main distribution format for L^AT_EX style files.
 - .ins: The installer for the files contained in the matching .dtx file
 - .cls: Class files define what your document looks like.
 - .fd: Font description file telling L^AT_EX about new fonts.
- Following files are generated when you run L^AT_EX on your input file.
 - .dvi: Device independent file. This is the main result of a classical L^AT_EX compile run.
 - .log: Gives a detailed account of what happened during the last compilation.

- .toc: Stores all your section headers. It gets read in for the next compiler run and is used to produce the table of contents.
- .lof: like the .toc file but for the figures.
- .lot: like the .toc file but for the tables.
- .aux: Another file that transports information from one compiler run to the next. Aux files are used for store information associated with cross references.
- .idx: Stores the indexing information.
- .ind: The processed index file. Ready for inclusion into your document on the next compile cycle.
- .ilg: Log file for index generation process.

1.5 Big Projects

- You can load your other input documents into the current context using `\include{filename}`
- `\includeonly{filename, filename, ...}` command can be used in the preamble. It allows you to instruct \LaTeX to only input some of the included files.
- `include{filename}` command includes the given file on a new page. Sometimes this is not desirable for these type of situations you can use `\input{filename}`

2 Typesetting Text

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