Introduction to LaTeX

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(Thanks to Oscar Vega for sharing his slides)

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What is LaTeX?

- LaTeX is a language developed to create professional looking mathematical documents. Books, articles, this presentation, posters, handouts, assignments, exams, etc. are examples of documents one can create using LaTeX.

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Word

A nice integral and a nice series for you guys to play with:

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LaTeX

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Getting Started: Installation


For Debian or Ubuntu: `apt-get install texlive`, for RedHat or CentOS: `yum install tetex`.
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If you do not want to (or can't) have LaTeX in your computer:

`https://www.overleaf.com`

`https://www.sharelatex.com`

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- After you write your stuff, you can compile your tex file and obtain a pdf file as an output.

Preamble

The preamble goes before your document starts. Here you do the general formatting of the document.

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```
\documentclass{amsart}
\usepackage{amsfonts,amsmath, amssymb, graphicx, array, multirow, colortbl, comment, enumerate}
\setcounter{MaxMatrixCols}{30}
\setlength{\topmargin}{-.1in}
\setlength{\textheight}{8in}
\setlength{\oddsidemargin}{0.1in}
\setlength{\evensidemargin}{0.1in}
\setlength{\textwidth}{6.5in}
\newtheorem{theorem}{Theorem}
\theoremstyle{plain}
\newtheorem{acknowledgement}{Acknowledgement}
\newtheorem{case}{Case}
\newtheorem{claim}{Claim}
\newtheorem{conclusion}{Conclusion}
\newtheorem{conjecture}{Conjecture}
\newtheorem{corollary}{Corollary}
\newtheorem{definition}{Definition}
\newtheorem{example}{Example}
\newtheorem{exercise}{Exercise}
\newtheorem{lemma}{Lemma}
\newtheorem{notation}{Notation}
\newtheorem{problem}{Problem}
\newtheorem{proposition}{Proposition}
\newtheorem{remark}{Remark}
\numberwithin{equation}{section}
\newcommand{\dusty}{\textcolor{blue}}
\newcommand{\tom}{\textcolor{magenta}}
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%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
\begin{document}
\begin{center}
{\huge{\textbf{Project Description: Narrative}}}
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Then again, if you have a good library of templates, then you will not need to worry too much about the preamble.

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The first line of the input file should normally consist of an appropriate **\documentclass command**.

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If a homework, handout (or similar document) is to be produced on A4 paper, and if the main body of the text is to be set with a font whose natural size is '12 point', then the appropriate \documentclass command is

\documentclass[12pt]{article} or \documentclass[12pt]{amsart}

If 12pt is omitted from the \documentclass command, then the document will be set in a '10 point' size. One may also replace 12pt with 11pt.

Other forms of the\documentclass command can be used for letters, reports or books.

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Finally, we end the input file with a line containing the command

\end{document}

Characters and Control Sequences

Most characters on the keyboard, such as letters and numbers, have their usual meaning. However the characters:

\ { } $ ^ _ # &

are used for special purposes within LaTeX. Thus typing one of these characters will not produce the corresponding character in the final document.

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Mathematical documents often contain arrays of numbers or symbols (matrices) and other complicated expressions. These are produced in LaTeX using **control sequences**. Most control sequences consist of a backslash \ followed by a string of (upper or lower case) letters.

Characters and Control Sequences

For example, \delta, \emph and \to are control sequences.

- The control sequence \delta produces the greek letter δ;
- The control sequence \emph (or \textit), when followed by text enclosed within braces, will cause that text to be emphasized (usually by typesetting it in an *italic font*);
- The control sequence \to (or \rightarrow) produces the arrow $\rightarrow$.

There is another type of control sequence which consists of a backslash followed by a *single* character that is not a letter. Examples of control sequences of this type are: \{, \}, \$.

Characters and Control Sequences

- The ‘braces’ { and } are used for grouping: the characters they enclose are treated as a single ‘group’, which can be specified as an ‘argument’ of a control sequence such as \emph, or as a superscript or subscript in a mathematical formula.

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- The special character # is used to specify arguments in definitions of control sequences.
- The special character & is used when typesetting tables in order to separate entries in different columns.

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Guess the Code for that Symbol!!

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- Issue the command

```
\includegraphics[width=4in]{LaTeXisAwesome.pdf}
```

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Arm 1 & Arm 2 & Hypothenuse \\
\hline
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5 &  & 13 \\
 & 24 & 25
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- The fancier the table, the more packages you will need.

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$$\longrightarrow \quad \left[\begin{array}{cc} 1 & 2 \\ 3 & 4 \end{array} \right]$$

```
\begin{align*}
(x^2+3x-1)' & = (x^2)'+(3x)'-(1)' \\
& = 2x+3-0 \\
& = 2x+3 \\
\end{align*}
```

$$\begin{aligned} (x^2+3x-1)' &= (x^2)'+(3x)'-(1)' \\ &= 2x+3-0 \\ &= 2x+3 \end{aligned}$$

Additional Resources

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- Ask LaTeX fanboys/fangirls.

Thank you!