LaTeX

250H
What is LaTeX

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  - You can edit .tex files in something like Notepad, however most people use a LaTeX editor
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- It is free and can be downloaded at https://www.latex-project.org/get/
- We highly recommend you learn it now as you typeset your homework!
History

- Donald Knuth in the late 1970's created TeX to help him write his books *The Art of Computer Programming* Volume 1, 2, 3, 4
  - He did not publish 4, just 4A
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- According to Wikipedia, TeX is intended to be pronounced like tech with the letters of the name being represented by the capital Greek letters tau, epsilon, and chi, as TeX is an abbreviation of τέχνη
  - Τέχνη is greek for both "art" and "craft", which is also the root word of technical
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- Leslie Lamport in the early 1980's then used TeX as the basis for LaTeX which has a lot more macros in it and has become the standard
Starting a document

\documentclass{article}
\usepackage[utf8]{inputenc}
\begin{document}
% text will go here
\end{document}

- \documentclass{document class}
  - article
    - Short documents and journal articles
    - Most commonly used
Starting a document

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- \documentclass{document class}
  - article
    - Short documents and journal articles
    - Most commonly used
  - report
    - Longer documents
  - book
  - letter
  - slides
    - Rarely used
    - Replaced by beamer
  - beamer
    - Slides in the Beamer class format
Starting a document

\documentclass{article}
\usepackage[utf8]{inputenc}
\begin{document}
% text will go here
\end{document}

- \usepackage[utf8]{inputenc}
  - The inputenc package translates various standard and other input encodings into a ‘LATEX internal language’.
  - utf8 is one of these encodings
Starting a document

\documentclass{article}
\usepackage[utf8]{inputenc}
\begin{document}
% text will go here
\end{document}

- \usepackage[options]{package name}
  - Package is the name of the package
  - Options is an optional list of keywords that trigger special features in the package
Starting a document

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- \texttt{\usepackage[options]{package name}}
  - Package is the name of the package
  - Options is an optional list of keywords that trigger special features in the package

- Some Useful Packages:
  - \texttt{amssymb}
    - Adds more symbols and formats
  - \texttt{amsmath}
    - Adds options for displaying equations
  - \texttt{xcolor}
    - Add color to a doc
  - \texttt{graphics}
    - Add pictures to a doc
Starting a document

\documentclass{article}
\usepackage[utf8]{inputenc}
\begin{document}
% text will go here
\end{document}

- \% comment
  - Creates a comment just like how comments are used in other programming languages
Starting a document

\documentclass{article}
\usepackage[utf8]{inputenc}
\begin{document}
% text will go here
\end{document}

- \begin{environment}
  \end{environment}
  - Tells LaTeX that anything in the middle of the begin and end follow a specific environment
Starting a document

\documentclass{article}
\usepackage[utf8]{inputenc}
\begin{document}
% text will go here
\end{document}

- \begin{environment}
  \end{environment}
  - Tells LaTeX that anything in the middle of the begin and end follow a specific environment

- Common Environments:
  - \texttt{document}
    - Creates a document
  - \texttt{equation}
    - Creates an equation
  - \texttt{tabular}
    - Inserts a table
  - \texttt{figure}
    - Inserts a table
  - \texttt{enumerate}
    - Creates a numbered list
  - \texttt{itemize}
    - Creates a bulleted list
Typing Math

- $ allows you to enter math mode
  - $ $ will make it so that the equation is inline with your other text
  - $$ $$ will make it so that the equation is on its own line and is centered
Typing Math

- \( \frac{x}{y} \)
  - \( \frac{x}{y} \)
    - \( \frac{x}{y} \)
Typing Math

● $\frac{x}{y}$
  ○ $\frac{x}{y}$

● $x_{y}$
  ○ $x_{y}$
Typing Math

- $\frac{x}{y}$
  - $x \quad \underline{\quad} \quad y$

- $x_{y}$
  - $x_{y}$

- $x^{y}$
  - $x^{y}$
Typing Math

- \(\frac{x}{y}\)
  - \(\frac{x}{y}\)
- \(x_{y}\)
  - \(x_{y}\)
- \(x^{y}\)
  - \(x^{y}\)
- \(x \equiv a \pmod{b}\)
  - \(x \equiv a \pmod{b}\)
Typing Math

- \[
\frac{n!}{k!(n-k)!} = \binom{n}{k}\]
  - \[
\frac{n!}{k!(n-k)!} = \binom{n}{k} = \binom{n}{k}
\]
Typing Math

- $\frac{n!}{k!(n-k)!} = \binom{n}{k}$
  - $\frac{n!}{k!(n-k)!} = \binom{n}{k}$

- $\sqrt[3]{x}$
  - $^{3}\sqrt{x}$
Typing Math

- \(\frac{n!}{k!(n-k)!} = \binom{n}{k}\)
  - \(\frac{n!}{k!(n-k)!} = \binom{n}{k}\)
- \(\sqrt[3]{x}\)
  - \(\sqrt[3]{x}\)
- \(\sum_{i=1}^{10} i\)
  - \(\sum_{i=1}^{10} i\)
Typing Math

- $\frac{n!}{k!(n-k)!} = \binom{n}{k}$
  - $\frac{n!}{k!(n-k)!} = \binom{n}{k}$

- $\sqrt[3]{x}$
  - $\sqrt[3]{x}$

- $\sum_{i=1}^{10} i$
  - $\sum_{i=1}^{10} i$

- $x \times y$
  - $x \times y$
Text Formatting

- \textit{}
  - Makes text italicized
Text Formatting

- \textit{}
  - Makes text italicized
- \textbf{}
  - Makes text bold
Text Formatting

- \textit{}
  - Makes text italicized
- \textbf{}
  - Makes text bold
- \underline{}
  - Underlines text
Text Formatting

- \textit{}
  - Makes text italicized
- \textbf{}
  - Makes text bold
- \underline{}
  - Underlines text
- \vspace{}
  - Adds vertical space (you would need to specify how much by something like \vspace{1 cm} )
Text Formatting

- \textit{} ○ Makes text italicized
- \textbf{} ○ Makes text bold
- \underline{} ○ Underlines text
- \vspace{} ○ Adds vertical space (you would need to specify how much by something like \vspace{1 cm} )
- \hspace{} ○ Adds horizontal space (you would need to specify how much by something like \hspace{1 cm} )
Tables

\begin{center}
\begin{tabular}{ c c c }
%cell1 & %cell2 & %cell3 \\
%cell4 & %cell5 & %cell6 \\
%cell7 & %cell8 & %cell9 \\
\end{tabular}
\end{center}

- \begin{center}
\end{center}

\begin{itemize}
\item Tells LaTeX that anything in the middle of the begin and end should be aligned to the center
\end{itemize}
Tables

\begin{center}
\begin{tabular}{ c c c }
%cell1 & %cell2 & %cell3 \\ 
%cell4 & %cell5 & %cell6 \\ 
%cell7 & %cell8 & %cell9 \\
\end{tabular}
\end{tabular}
\end{center}

- \begin{tabular}{ c c c }
Tells LaTeX to create a table
Tables

\begin{center}
\begin{tabular}{ c c c }
  \%cell1 & \%cell2 & \%cell3 \\
  \%cell4 & \%cell5 & \%cell6 \\
  \%cell7 & \%cell8 & \%cell9
\end{tabular}
\end{tabular}
\end{center}

- \begin{tabular}{ c c c }
  \end{tabular}

- \begin{tabular}{ c c c }
  \end{tabular}

- Tells LaTeX to create a table
  - \{ c c c \}
  - Tells LaTeX that everything in the cell should be centered and we have 3 columns
  - Note: this will not have any separator lines in between each column and row
## Tables

```latex
\begin{center}
\begin{tabular}{ c c c }
%cell1 & %cell2 & %cell3 \\
%cell4 & %cell5 & %cell6 \\
%cell7 & %cell8 & %cell9
\end{tabular}
\end{tabular}
\end{center}
```

- \ \\ \%
  - Creates a new line
Tables

\begin{center}
\begin{tabular}{ c c c }
%cell1 & %cell2 & %cell3 \\
%cell4 & %cell5 & %cell6 \\
%cell7 & %cell8 & %cell9
\end{tabular}
\end{tabular}
\end{center}

- \textbackslash\textbackslash
  - Creates a new line
- \&
  - Creates a new cell
Figures

\begin{figure}
  \includegraphics{\%where the image is on your computer}
  \caption{\%caption}
  \label{\%whatever you want to label it as to reference later}
\end{figure}

\begin{itemize}
  \item \begin{figure}
    \includegraphics
    \caption{}
    \label{}
  \end{figure}
    \begin{itemize}
      \item Creates figure environment
    \end{itemize}
\end{itemize}
Figures

\begin{figure}
\includegraphics{\%where the image is on your computer}
\caption{\%caption}
\label{\%label name}
\end{figure}

- \texttt{\includegraphics\{graphic name\}}
  - Inserts the graphic
Figures

\begin{figure}
\includegraphics{where the image is on your computer}
\caption{caption}
\label{label name}
\end{figure}

- \texttt{\includegraphics\{graphic name\}}
  - Inserts the graphic
- \texttt{\caption\{text for your caption\}}
  - Inserts a caption below the picture
Figures

\begin{figure}
\includegraphics{where the image is on your computer}
\caption{caption}{text for your caption}
\label{label name}
\end{figure}

- \includegraphics{graphic name}
  - Inserts the graphic
- \caption{text for your caption}
  - Inserts a caption below the picture
- \label{Label Name}
  - Creates a label so you can reference the figure in the text of a document
    - \ref{Label Name} will do this
Helpful Links

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  - Online LaTeX editor
  - Allows you to have source code on the left and compiled pdf on the right
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- [http://detexify.kirelabs.org/classify.html](http://detexify.kirelabs.org/classify.html)
  - Allows you to draw the symbol you are looking for and it gives you the LaTeX code