

Brief Introduction to L^AT_EX

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September 19, 2018

Text is simply typed in, extra spacing in plain text does not matter. Commands begin with backslash and affect curly-brace-enclosed areas. Comments start with %.

1 Basics

Set document style, title and author. Must enclose document with `\begin` and `\end`.

```
\documentclass[12pt]{article}
```

```
\begin{document}
```

```
\title{}
```

```
\author{}
```

```
\maketitle
```

```
% document starts here ...
```

```
\end{document}
```

Set margins and text height/width, these commands go before `\begin{document}` :

```
\setlength{\topmargin}{0in}
```

```
\setlength{\textheight}{8in}
```

```
\setlength{\oddsidemargin}{0in}
```

```
\setlength{\textwidth}{6.5in}
```

```
\setlength{\voffset}{-1in}
```

2 Sectioning

`\section{}`
`\subsection{}`
`\subsubsection{}`

3 Fonts

3.1 Style

- `\underline{LaTeX}` \Rightarrow LaTeX
- `{\em LaTeX}` \Rightarrow *LaTeX* `{\it LaTeX}` \Rightarrow *LaTeX*
- `{\sl LaTeX}` \Rightarrow *LaTeX*
- `{\bf LaTeX}` \Rightarrow **LaTeX**
- `{\tt LaTeX}` \Rightarrow LaTeX

3.2 Size

<code>{\tiny LaTeX}</code> \Rightarrow LaTeX	<code>{\large LaTeX}</code> \Rightarrow LaTeX
<code>{\scriptsize LaTeX}</code> \Rightarrow LaTeX	<code>{\Large LaTeX}</code> \Rightarrow LaTeX
<code>{\footnotesize LaTeX}</code> \Rightarrow LaTeX	<code>{\LARGE LaTeX}</code> \Rightarrow LaTeX
<code>{\small LaTeX}</code> \Rightarrow LaTeX	<code>{\huge LaTeX}</code> \Rightarrow LaTeX
<code>{\normalsize LaTeX}</code> \Rightarrow LaTeX	<code>{\Huge LaTeX}</code> \Rightarrow LaTeX

3.3 Symbols

3.3.1 Foreign Language Accents

`\~{o}` \Rightarrow ã `\`{o}` \Rightarrow ò `\'o` \Rightarrow ó `\"o` \Rightarrow ö `\^{o}` \Rightarrow ô

3.4 Others

`\dag` \Rightarrow † `\S` \Rightarrow § `\pounds` \Rightarrow £ `\ae` \Rightarrow æ `\AA` \Rightarrow Å

4 Enviornments

LaTeX defines many convenient environments such as *itemize*, *enumerate*, *tabular*, *array* and *verbatim* etc. Please refer to manuals for detailed usage information on different environments.

```
\begin{itemize}
\item
% first item
\item
% second item
\end{itemize}
```

5 Citations and Bibliography

1. Create a bibliography file (text file) with extension `.bib`. See an example bib file at `~dxu/handouts/cs340/example.bib`.

2. In your main text, simply use `\cite{citationlabel}` wherever appropriate.

Add these two lines to the end of your document before `\end{document}` :

```
\bibliographystyle{alpha}
\bibliography{nameofbibfilewithoutextension}
```

See an example LaTeX file with citations at `~dxu/handouts/cs340/citation.tex`.

3. Say your latex file is named `homework.tex` and you created a `.bib` file and cited it accordingly in `homework.tex`.
 - (a) Run LaTeX on `homework.tex` (`pdflatex homework.tex`) as usual, you will get warnings about references undefined, that is normal.
 - (b) Run `bibtex homework`.
 - (c) Then run LaTeX on `homework.tex` two more times. The third time LaTeX will run without warnings and all bib references will be properly incorporated.

6 Math symbols and formulas

Must be in math mode. Math mode is switched on by `$$` or `\[\]` (display).

6.1 Subscripts and Superscripts

$$\begin{aligned} \$x^2\$ &\Rightarrow x^2 & \$x^{2y}\$ &\Rightarrow x^{2y} & \$x^{(2^y)}\$ &\Rightarrow x^{2^y} \\ \$x_2\$ &\Rightarrow x_2 & \$x^{y_1}\$ &\Rightarrow x^{y_1} & \$x_1^y\$ &\Rightarrow x_1^y \end{aligned}$$

6.2 Symbols

α	θ	ϕ
Δ	Λ	Ω
\cap	\triangleup	\div
\triangleleft	\oplus	\leq
\succeq	\equiv	\approx
\supset	\in	\leftarrow
\Leftarrow	\leftrightarrow	\Longleftarrow
\nearrow	\uparrow	∞
\forall	\spadesuit	\sharp

6.3 Formulae

Display is achieved with `\[\]` and inline with `$$`.

- `\[x = \frac{y+\frac{z}{y-2}}{y^2+1} \]` \Rightarrow

$$x = \frac{y + \frac{z}{y-2}}{y^2 + 1}$$

- `\[\sum_{i=1}^n x_i = \int_0^1 f \]` \Rightarrow

$$\sum_{i=1}^n x_i = \int_0^1 f$$

- `$$ \sum_{i=1}^n x_i = \int_0^1 f $$` $\Rightarrow \sum_{i=1}^n x_i = \int_0^1 f$

- `\[\underbrace{a + \overbrace{b + \cdots + y}^{24}}_{26} + z \]` \Rightarrow

$$a + \underbrace{\overbrace{b + \cdots + y}^{24}}_{26} + z$$

- `\left(\begin{array}{c} \left| \begin{array}{cc} x_{11} & x_{12} \\ x_{21} & x_{22} \end{array} \right. \\ y \\ z \end{array} \right)`

⇒

$$\left(\begin{array}{c} \left| \begin{array}{cc} x_{11} & x_{12} \\ x_{21} & x_{22} \end{array} \right. \\ y \\ z \end{array} \right)$$

- `x = \left\{ \begin{array}{l} y & \text{\mbox{if } $y>0$} \\ z+y & \text{\mbox{otherwise}} \end{array} \right.`

⇒

$$x = \begin{cases} y & \text{if } y > 0 \\ z + y & \text{otherwise} \end{cases}$$

7 Special Characters

Certain characters are special because they appear in LaTeX commands. They are:

`# $ % & ~ _ ^ \ { }`

Seven of them `# $ % & _ { }` can be produced simply by escaping them with a `\` directly in front. The other three `~ ^ \` usually only appear in simulated keyboard input and must be produced using the *verbatim* environment.

- direct escape `\$ ⇒ $`

- *verbatim*

1. inline `\verb+~ ^ \+ ⇒ ~ ^ \`

```
2. display
   \begin{verbatim}

   ~ ~ \

   \end{verbatim}
```

8 Running L^AT_EX

1. Save with extension `.tex`.
2. You can then process the saved text document say `test.tex` in two ways:
 - (a) dvi to postscript to pdf:
 - i. Use command `latex test.tex`. If no errors, this creates a dvi file, `test.dvi`.
 - ii. Use `dvips test.dvi -o test.ps` to generate a postscript file `test.ps` that can be printed.
 - iii. Use `ps2pdf test.ps` to convert to pdf format if desired.
 - (b) Direct to pdf: Or you may use the command `pdflatex test.tex` to generate a pdf document called `test.pdf` directly.