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Introduction To L^AT_EX

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SIGNewGrad: Introduction To L^AT_EX



Outline

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What is \LaTeX

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What is the difference between a WYSWYG word processor and \LaTeX ?



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What is the difference between a WYSWYG word processor and \LaTeX ?

Answer:

WYSIWYG

What you
see



What you
get



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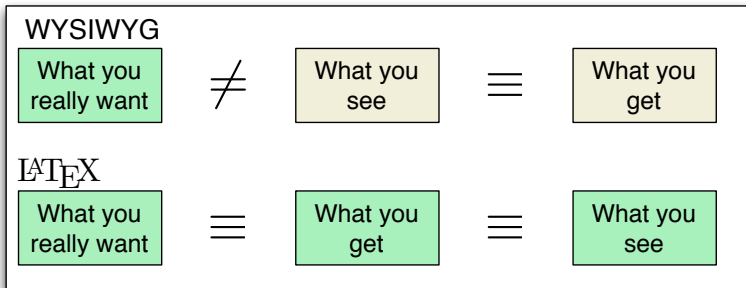
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\LaTeX is a great tool for:

- Typesetting documents
- Creating Presentations



Why use \LaTeX ?

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- Focus is on *writing* as opposed to formatting
 - In \LaTeX , you describe a document's structure instead of how it is formatted
 - Formatting is essentially automatic
- \LaTeX produces significantly better formatted documents
 - \LaTeX knows how to do hyphenation, kerning, ligatures, etc
- \LaTeX has excellent support for equation and formulae.

For more, check out *Word Processors: Stupid and Inefficient*

<http://ricardo.ecn.wfu.edu/~cottrell/wp.html>



Disadvantages of \LaTeX ?

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- Creating style files from scratch is **very** hard.
- Error messages are unhelpful.
- Making tables and figures is cumbersome.



What is $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$?

$\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$

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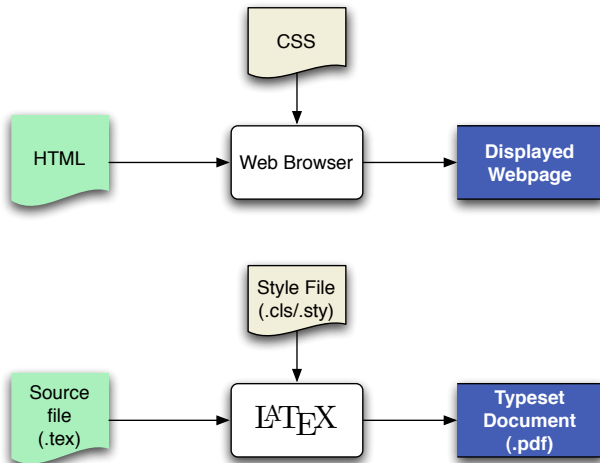
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Special Characters

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- Equivalent to *reserved words* in other languages
- If needed, use the following replacements:

Special character	Replacement text
#	\#
\$	\\$
%	\%
^	\^{ }
&	\&
_	_
{	\{
}	\}
~	\~{ }
\	\$_\backslash\$ backslash \$



Commands

- are instructions to L^AT_EX
 - usually to change the formatting or layout of text
- are case sensitive
- have the following format:

```
\command[optional args]{required args}
```



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All whitespace after commands is ignored. If you need whitespace, add an extra `{}`.

```
I read that Knuth divides
the people working with
\TeX{} into \TeX{}nicians
and \TeXperts.
```

I read that Knuth divides the
people working with T_EX into
T_EXnicians and T_EXperts.



L^AT_EX Environments

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- Affects all text within the environment
- Conveniently hides a ton of commands
- Format:

```
\begin{name}[opts]{args}
    % text
\end{name}
```




Example Document [ex1.tex]

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```
\documentclass{article}  
% this section is the preamble...
```

```
\begin{document}
```

This is the first paragraph.

For **\LaTeX**, a paragraph is a continuous sequence

of lines, ending with a blank line. This means

```
you      can  put  
one      word
```

```
per  
line
```

if you wish and **\LaTeX**{ } will treat the text as one paragraph.

This is the second paragraph. Just put in here to show how paragraphs separate.

```
\end{document}
```



Running L^AT_EX

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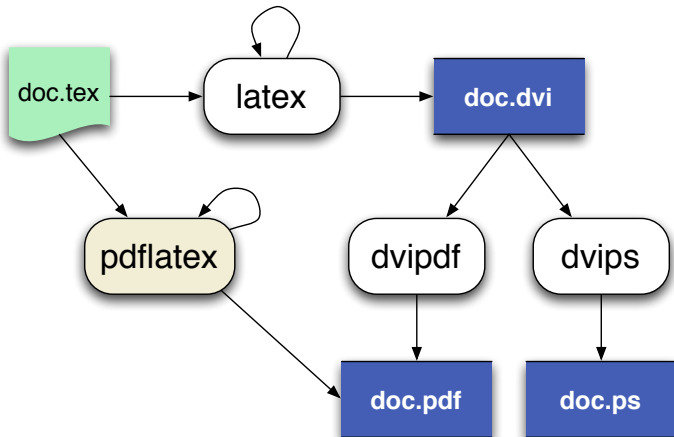
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- Let you break document into sections
- Each section has running counter (e.g., Section 1, Section 2, Section 2.3.4)

Table: Sectioning commands in the **article** environment

Numbered	Unnumbered
<code>\section{...}</code>	<code>\section*{...}</code>
<code>\subsection{...}</code>	<code>\subsection*{...}</code>
<code>\subsubsection{...}</code>	<code>\subsubsection*{...}</code>
<code>\paragraph{...}</code>	<code>\paragraph*{...}</code>
<code>\subparagraph{...}</code>	<code>\subparagraph*{...}</code>



Sectioning Example

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```
\section{In The First Section}
```

This is the first section.

```
\subsection{We Have This First  
Subsection}
```

This is the first subsection.

```
\subsubsection{And This Subsubsection}
```

A subsubsection.

```
\paragraph{And This Paragraph}
```

A notable paragraph.

```
\subparagraph{And This Subparagraph}
```

A notable subparagraph.

```
\subsubsection{And Then This  
Subsubsection}
```

```
\section{The This Second Section}
```

```
\subsection{We Have This Subsection}
```

1 In The First Section

This is the first section.

1.1 We Have This First Subsection

This is the first subsection.

1.1.1 And This Subsubsection

A subsubsection.

And This Paragraph A notable paragraph.

And This Subparagraph A notable subparagraph.

1.1.2 And Then This Subsubsection

2 The This Second Section

2.1 We Have This Subsection



Sectioning (cont.)

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- In addition, the **report** and **book** classes support an additional command for chapters:

```
\chapter[Short Form for TOC]{Long and  
Boring Form in the actual chapter}
```

- To display a table of contents, use the command:

```
\tableofcontents
```



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Table: Command used for labels and references

Command	Purpose
<code>\label{marker}</code>	to “name” a place that you wish to refer back to.
<code>\ref{marker}</code>	to refer back to the place with the name “marker”.
<code>\pageref{marker}</code>	to refer to the page where the label “marker” appeared.



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A reference to this subsection
`\label{sec:this}` looks like: “See section~`\ref{sec:this}` on page~`\pageref{sec:this}`”.

A reference to this subsection looks like: “see section 2.8 on page 37.”



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Bulleted Lists

```
\begin{itemize}
  \item First Item
  \item Second Item
\end{itemize}
```

- First Item
- Second Item

Enumerated Lists (automatically counted):

```
\begin{enumerate}
  \item First Item
  \item Second Item
\end{enumerate}
```

- 1 First Item
- 2 Second Item

Description Lists

```
\begin{description}
  \item [First] Item
  \item [Second] Item
\end{description}
```

First Item
Second Item



Font Styles

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Changes the appearance of text

`\texttt{TeleType text}`

TeleType text

`\textbf{BoldFace text}`

BoldFace text

`\textsl{Slanted text}`

Slanted text

`\textit{ITalicized}`

ITalicized text.

`\textrm{RoMan}`

RoMan

`\textsc{Small Caps}`

SMALL CAPS

`\textsf{Sans Serif}`

Sans Serif



Font Sizes

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```
{\tiny really small}
```

```
{\scriptsize next smallest}
```

```
{\footnotesize footnote sized}
```

```
{\small smaller than normal}
```

```
{\normalsize regular sized}
```

```
{\large larger than normal}
```

```
{\Large larger}
```

```
{\LARGE larger still}
```

```
{\huge very large}
```

```
{\Huge huge}
```

really small

next smallest

footnote sized

smaller than normal

regular sized

larger than normal

larger

larger still

very large

huge



Typesetting Equations

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Use the *math mode*

- Inline with normal text: $e=mc^2$ ($e = mc^2$)

- As a separate paragraph:

```
\begin{displaymath}
```

```
e=mc^2
```

$$e = mc^2$$

```
\end{displaymath}
```

- With equation numbers:

```
\begin{equation}
```

```
e=mc^2
```

$$e = mc^2 \quad (1)$$

```
\end{equation}
```



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$$x^2 + y^2$$

$$x_i + y_i$$

$$\sqrt{x^2_i + y^2_i}$$

$$\frac{x}{y}$$

$$\alpha, \beta, \pi, \Pi$$

$$\sum_{i=0}^n i$$

$$x^2 + y^2$$

$$x_i + y_i$$

$$\sqrt{x^2_i + y^2_i}$$

$$\frac{x}{y}$$

$$\alpha, \beta, \pi, \Pi$$

$$\sum_{i=0}^n i$$



Floating Environments

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- Certain environments can “float”
 - Do not appear exactly where you put them
 - LaTeX moves them for better placement
 - Can be frustrating if L^AT_EX picks bad spot
- Tables/Figures are most common



Tables

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```
\begin{table}
  \caption{My First Table}
  \begin{center}
    \begin{tabular}{|l|c|r|}
      \hline
      left          & center          & right          \\
      \hline\hline
      row 2, col 1  & row 2, col 2   & row 2 col 3   \\
      row 3, col 1  &                  &                \\
      \hline
    \end{tabular}
  \end{center}
  \label{tab:myTable}
\end{table}
```



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Table: My First Table

left	center	right
row 2, col 1	row 2, col 2	row 2, col 3
row 3, col 1		



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```
\begin{figure}
  \begin{center}
    \includegraphics[width=5cm]{masthead.png}
    \caption{My first image... From the CTAN servers}
    \label{default}
  \end{center}
\end{figure}
```



Figure: My first figure... From the CTAN servers



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References

- Place `\cite{key}` where you want a citation to appear
 - `key` is a unique citation key
 - generates reference label at that spot
- BibT_EX manages citations
- Add following to body of your document
 - `\bibliographystyle{type}`
 - `type = style` (plain, abbrv, alpha)
 - Other styles available (see natbib)
 - `\bibliography{bib-file}`
 - `bib-file` is a BibT_EX file with citations
 - This command appears where you want the bibliography (usually end of document)



Example Bib_T_EX File

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```
@String{aamas = "International Joint Conference  
on Autonomous Agents and Multiagent Systems"}
```

```
@article{kamboj.07b,  
  author = {Kamboj, Sachin and Decker, Keith S.},  
  journal = {Proceedings of the Sixth aamas},  
  month = {May},  
  pages = {1220--1227},  
  title = {Organizational Self-Design in  
           Semi-dynamic Environments},  
  year = {2007}  
}
```



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L. Lamport.

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Online References

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- **The Not so Short Introduction to L^AT_EX**

<ftp://tug.ctan.org/tex-archive/info/lshort/english/lshort.pdf>

- **T_EX Frequently Asked Questions**

<http://www.tex.ac.uk/cgi-bin/texfaq2html>

- **L^AT_EX on wikibooks**

<http://en.wikibooks.org/wiki/LaTeX>

- **Hypertext Help with LaTeX**

<http://web.mit.edu/vogt/www/latex/>

- **The L^AT_EX Project Page**

<http://www.latex-project.org/>

- **And Google, of course...**



Other Resources

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L^AT_EX Distributions:

- **Unix/Linux:** teTeX (<http://www.tug.org/teTeX/>)
TeX Live (<http://www.tug.org/texlive/>)
- **Mac OS X:** MacTeX
(<http://www.tug.org/mactex/>)
- **Windows:** MiKTeX (<http://www.miktex.org/>)

L^AT_EX Package Repository:

- **The Comprehensive TeX Archive Network**
<http://ctan.org/>