

Academic Writing with \LaTeX

Mandar Mitra

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- 1 Introduction
- 2 Getting started
- 3 Kile
- 4 Document structure
- 5 Formatting
- 6 Mathematical content
- 7 Bibliography

Who is this?



Who is this?



Donald E. Knuth

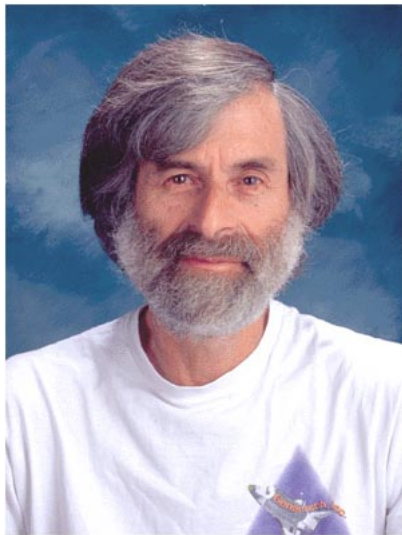
Professor Emeritus Stanford
University

Turing Awardee, 1974

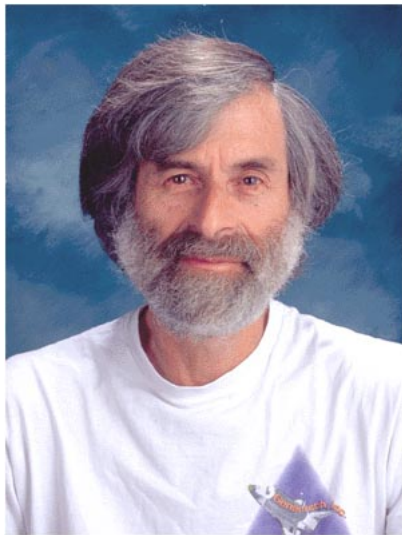
Creator of

$\text{T}_{\text{E}}\text{X}$ (1978)

And this?



And this?



Leslie Lamport

Creator of

\LaTeX (1985)

Why L^AT_EX?

- Superior typesetting quality (esp. of mathematical expressions)
- Allows user to focus on content rather than formatting
 - **consistent** formatting of elements
 - no need to remember margins, spacing (before / after), font size, etc.
 - no need to manually number sections, tables, figures, footnotes, citations, references, etc.
 - automatic creation of table of contents, index, etc.
- **Free** software (*mukt* + *muft*)
If you don't like something, change the software (somebody probably already has).
- Widely used by the academic / scientific community
- Can be viewed / edited with any text editor

Disadvantages

- Not WYSIWYG
- Need to remember formatting commands
IDEs (see the Wiki book for a list) make it easy

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- **Wiki book (Recommended!)**

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

- Getting started: <http://www.tug.org/begin.html>

- Basic Introduction

<http://how-to.linuxcareer.com/introduction-to-latex-on-linux>

- Latex quick reference

<http://www.giss.nasa.gov/tools/latex/ltx-2.html>

- Tex FAQ

<http://www.tex.ac.uk/cgi-bin/texfaq2html?introduction=yes>

- Stack exchange: <http://tex.stackexchange.com/>

- Writing in Indian languages (e.g. Bangla)

<http://methopath.wordpress.com/2008/06/26/writing-unicode-bengali-in-latex/>

- LaTeX Lab : <http://docs.latexlab.org/>
- ShareLaTeX : <https://www.sharelatex.com/>
- writeLaTeX.com : <https://www.writelatex.com/>

```
\documentclass[12pt,a4paper]{report}

% This is a comment that says where the preamble is.

\begin{document}
Hello World!
\end{document}
```

Hello world!

```
\documentclass[12pt,a4paper]{report}
```

```
% This is a comment that says where the preamble is.
```

```
\begin{document}
```

```
Hello World!
```

```
\end{document}
```

Document types

- `article`: papers, articles, etc.
- `book`
- `report`: technical reports, booklets, theses, etc.
- `letter`
- `beamer`: presentations (like this one)


Document types

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- `book`
- `report`: technical reports, booklets, theses, etc.
- `letter`
- `beamer`: presentations (like this one)
- `IEEEtran`
- `llncs.cls`
- `acm_proc_article-sp.cls`

Typical usage

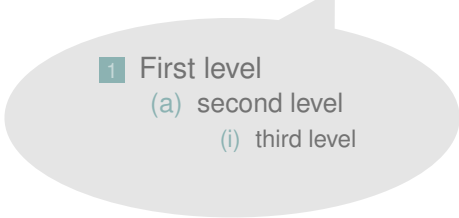
- Packages: `\usepackage [options] {package}`
- Define commands
 - `\newcommand{\union} {\cup}`
 - `\renewcommand{\labelenumiii}{(\roman{enumiii})}`

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- 
- 1 First level
 - (a) second level
 - (i) third level

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`http://kile.sourceforge.net/`

Most important commands

- Starting
 - File → New, or
 - Wizard → Quick Start
- Formatting: use menu or auto-completion
- Inserting symbols: use menu or auto-completion
- Compiling and debugging

`http://kile.sourceforge.net/`

Most important commands

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Other commands

- Navigation: Edit → Go to
- Select / delete / operate on chunks: Edit menu

- GNU/Linux: use your favourite package manager (apt-get, synaptic, yum, yumex, etc.)

- Windows:

`https://sourceforge.net/apps/mediawiki/kile/index.php?title=KileOnWindows`

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```
\title{Academic Writing with \LaTeX}  
\author[M.Mitra]{Mandar Mitra}  
\institute[ISI]{  
    Indian Statistical Institute  
}  
\date{} % OR \date{\today}  
  
\begin{document}  
\maketitle
```



```
\title{Academic Writing with \LaTeX}  
\author[M.Mitra]{Mandar Mitra}  
\institute[ISI]{  
    Indian Statistical Institute  
}  
\date{} % OR \date{\today}  
  
\begin{document}  
\maketitle
```

■ Levels:

```
\part{title}
```

```
\chapter{title}
```

```
\section{title}
```

```
\subsection{title}
```

```
\subsubsection{title}
```

```
\paragraph{title}
```

```
\subparagraph{title}
```

- Use `\section[short title]` if necessary
e.g. `\section[Short title]\{An unnecessarily long title
that goes on and on and on}`
- Use `\section*{}` to avoid numbering
- Paragraphs: leave a blank line to start a new paragraph
- Appendices: use `\appendix` (once!) followed by `\chapter` or `\section`

```
\begin{environment-name}  
  Contents of environment  
\end{environment-name}
```

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Text style

LaTeX command	Equivalent to	Output style	Remarks
<code>\textnormal{...}</code>	<code>{\normalfont ...}</code>	document font family	this is the default or normal font
<code>\emph{...}</code>	<code>{\em ...}</code>	<i>emphasis</i>	typically italics
<code>\textrm{...}</code>	<code>{\rmfamily ...}</code>	roman font family	
<code>\textsf{...}</code>	<code>{\sffamily ...}</code>	sans serif font family	
<code>\texttt{...}</code>	<code>{\ttfamily ...}</code>	teletypefont family	this is a fixed-width or monospace font
<code>\textup{...}</code>	<code>{\upshape ...}</code>	upright shape	the same as the normal typeface
<code>\textit{...}</code>	<code>{\itshape ...}</code>	<i>italic shape</i>	
<code>\textsl{...}</code>	<code>{\slshape ...}</code>	<i>slanted shape</i>	a skewed version of the normal typeface
<code>\textsc{...}</code>	<code>{\scshape ...}</code>	SMALL CAPITALS	
<code>\uppercase{...}</code>		UPPERCASE (ALL CAPS)	Also <code>\lowercase</code> .
<code>\textbf{...}</code>	<code>{\bfseries ...}</code>	bold	
<code>\textmd{...}</code>	<code>{\mdseries ...}</code>	medium weight	a font weight in between normal and bold

Text size

Command	Output
<code>\tiny</code>	<small>sample text</small>
<code>\scriptsize</code>	<small>sample text</small>
<code>\footnotesize</code>	<small>sample text</small>
<code>\small</code>	<small>sample text</small>
<code>\normalsize</code>	sample text
<code>\large</code>	sample text
<code>\Large</code>	sample text
<code>\LARGE</code>	sample text
<code>\huge</code>	sample text
<code>\Huge</code>	sample text

Paragraph alignment

Alignment	Environment	Command
Left justified	<code>flushleft</code>	<code>\raggedright</code>
Right justified	<code>flushright</code>	<code>\raggedleft</code>
Center	<code>center</code>	<code>\centering</code>

Left justified

Here is some example text that demonstrates a formatting command.

Right justified

Here is some example text that demonstrates a formatting command.

Centred

Here is some example text that demonstrates a formatting command.

Paragraph alignment

Left justified

Here is some example text that demonstrates a formatting command.

Right justified

Here is some example text that demonstrates a formatting command.

Centred

Here is some example text that demonstrates a formatting command.

Use braces `{ }` to define a region to which an alignment command must be applied.

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- In line: use `$...$` or `\begin{math}...\end{math}`
- “Displayed” style:
 - use `\[... \]`
 - or `\begin{displaymath}...\end{displaymath}`
 - or `\begin{equation*}...\end{equation*}`

Examples

Inline style `$x + y = z$` $x + y = z$

Display style Some text: `\[x + y = z \]` Some text:
 $x + y = z$

Inline display Some text `$\displaystyle \sum$` Some text \sum

- Subscripts ($_$), superscripts (\wedge)
- Fractions ($\frac{\text{numerator}}{\text{denominator}}$)
- Binomial coefficients ($\binom{n}{k}$)

- Subscripts (`_`), superscripts (`^`)
- Fractions (`\frac{numerator}{denominator}`)
- Binomial coefficients (`\binom{n}{k}`)


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

- Subscripts (`_`), superscripts (`^`)
- Fractions (`\frac{numerator}{denominator}`)
- Binomial coefficients (`\binom{n}{k}`)


$$\binom{n}{k}$$

- Subscripts (`_`), superscripts (`^`)
- Fractions (`\frac{numerator}{denominator}`)
- Binomial coefficients (`\binom{n}{k}`)
- If mathematical notation is used extensively, use the `amsmath` or `mathtools` package

- \LaTeX Mathematical Symbols
- The Comprehensive \LaTeX Symbol List (Scott Pakin)
- The Great, Big List of \LaTeX Symbols (David Carlisle, Scott Pakin, Alexander Holt)

Arrays and delimiters

1	2	3
14	25	36
147	258	369

1	2	3
14	25	36
147	258	369

```
\[  
\left|  
\begin{array}{c c c}  
1 & 2 & 3 \\  
14 & 25 & 36 \\  
147 & 258 & 369 \\  
\end{array}  
\right.  
\]
```

$$\frac{d}{dx}(g(x))$$

$$\frac{d}{dx}(g(x))$$

$$\frac{d}{dx}(g(x))$$

$$\frac{d}{dx}(g(x))$$

(((((((

More delimiters

$$\frac{d}{dx}(g(x))$$

```
\[
  \frac{\mathrm{d}}{\mathrm{d}x} \left( g(x) \right)
\]
```

$$\frac{d}{dx}(g(x))$$

```
\[
  \frac{\mathrm{d}}{\mathrm{d}x} \big( g(x) \big)
\]
```

(((((((

```
\[ ~ ( ~ \big( ~ \Big( ~ \bigg( ~ \Bigg( ~ \]
```

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- Basic usage

```
\bibliographystyle{plain}
```

```
\bibliography{<filename>}
```

- To refer in text, use `\cite`, `\cite [p.100]`, or `{\nocite}`

Bibliographic references

Style Name ↕	Author Name Format ↕	Reference Format ↕	Sorting ↕
plain	Homer Jay Simpson	#ID#	by author
unsorted	Homer Jay Simpson	#ID#	as referenced
abbrv	H. J. Simpson	#ID#	by author
alpha	Homer Jay Simpson	Sim95	by author
abstract	Homer Jay Simpson	Simpson-1995a	
acm	Simpson, H. J.	#ID#	
authordate1	Simpson, Homer Jay	Simpson, 1995	
apa	Simpson, H. J. (1995)	Simpson1995	
named	Homer Jay Simpson	Simpson 1995	

Natbib package

- Use package `natbib`
- Styles: `plainnat`, `abbrvnat`, `unsrnat`, `IEEEtranN`

Citation command	Output
<code>\citet{goossens93}</code>	Goossens et al. (1993)
<code>\citep{goossens93}</code>	(Goossens et al., 1993)
<code>\citet*{goossens93}</code>	Goossens, Mittlebach, and Samarin (1993)
<code>\citep*{goossens93}</code>	(Goossens, Mittlebach, and Samarin, 1993)
<code>\citeauthor{goossens93}</code>	Goossens et al.
<code>\citeauthor*{goossens93}</code>	Goossens, Mittlebach, and Samarin
<code>\citeyear{goossens93}</code>	1993
<code>\citeyearpar{goossens93}</code>	(1993)