The Joys of LaTeX

A $\leq$60 minute lecture, with examples,

introducing the world's standard typesetting language.

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http://www.trinity.edu/vadim/latex.pdf

LaTeX?

LaTeX is not:

- Word processor
- Editor
- Computer program

LaTeX is:

- Language in which documents are specified in a logical (not physical) manner

Benefits

Professional-looking output

Easy to do challenging things like math formulas, footnotes, references, tables of contents, indices, bibliographies, etc.

Device and platform independent

Text-based

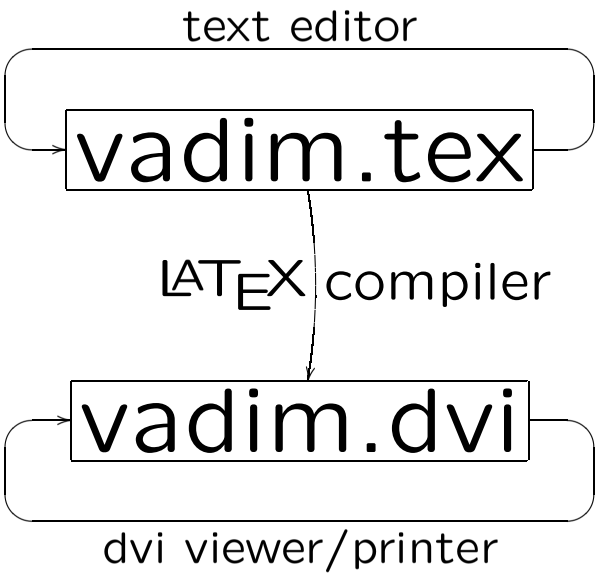
Encourages good organization

Free

History

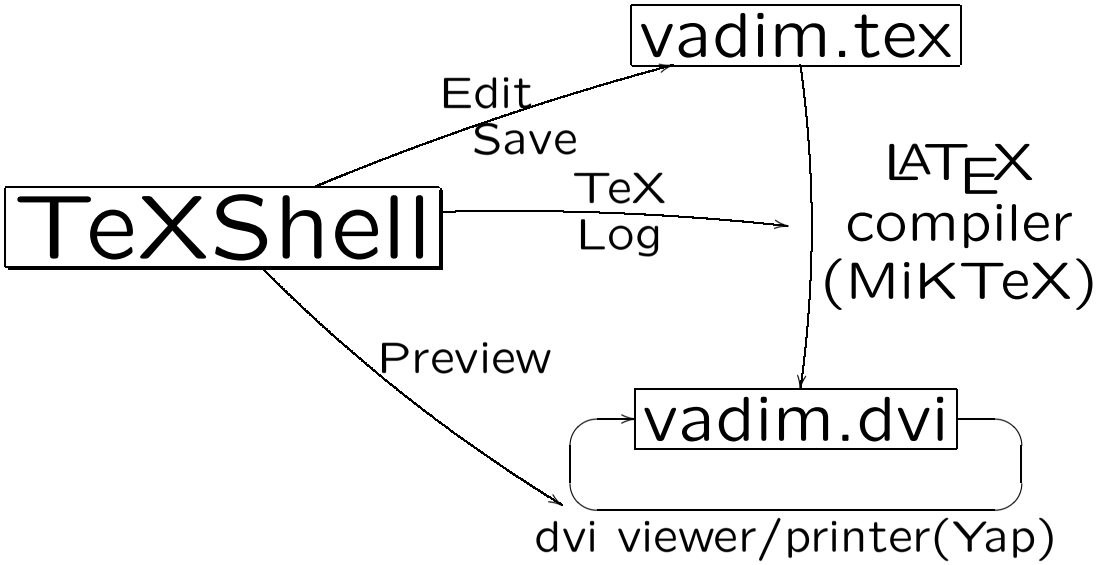
1977	Donald Knuth	TEX
1982	Leslie Lamport	LATEX
1994	Frank Mittelbach et al.	LATEX2$_\varepsilon$
someday	LATEX3 Team	LATEX3

Usage (simplified)



MiKTeX - free compiler, dvi viewer/printer (Yap)
WinEdt - shareware editor & frontend
TexShell - freeware editor & frontend

Usage (less simplified)



TeXShell Quirks

Long file names are poorly supported. Spaces cause problems; avoid them. This includes the folder "My Documents".

"Main File" is what is compiled. This may be something unexpected (such as not the file you are editing). Change this in the File pulldown.

Limited TeX-specific features. No BibTeX support or spellcheck.

Example 1

```
\documentclass[12pt]{letter}
\begin{document}
Don't worry  about    spaces or
line breaks; they are handled for you. %Comments
Math is easy: $\frac{1}{2}+\int_0^\infty x^{10} dx$.
Use \emph{this} for important words.
\end{document}
```

Don't worry about spaces or line breaks; they are handled for you. Math is easy: $\frac{1}{2} + \int_0^\infty x^{10} dx$. Use *this* for important words.

Example 2

```
\documentclass[landscape]{slides}
\usepackage{fancybox}
\begin{document}
\fancypage{\setlength{\fboxsep}{.2in}\doublebox}{}
\begin{tabular}{|lr|}
\hline  left & right \\
justified & justified \\
\hline \end{tabular}
\end{document}
```

---

left	right
justified	justified

Math

```
Important equations can get a number and their own line:
\begin{equation} 3^{2^x}\ge \mu \end{equation}
$x_1>x_2>\cdots, x_i\in\mathbf{R}, \sqrt{\sqrt[3]{x}},\ldots$
```

Important equations can get their a number and own line:

$$3^{2^x} \geq \mu \tag{1}$$

$x_1 > x_2 > \cdots, x_i \in \mathbf{R}, \sqrt{\sqrt[3]{x}}, \ldots$

Theorems

```
\newtheorem{vthm}{Theorem}
\begin{vthm}good theorem\label{good}\end{vthm}
\begin{proof}blah, blah\end{proof} ———————— amsthm
\begin{vthm}great theorem\label{great}\end{vthm}
We now generalize Theorem \ref{good} and Theorem \ref{great}.
```

Theorem 1. *good theorem*

Proof. blah, blah □

Theorem 2. *great theorem*

We now generalize Theorem 1 and Theorem 2.

Sums

LaTeX	Result
`\sum 3i`	$\sum 3i$
`\sum_{i=1}^73i`	$\sum_{i=1}^{7} 3i$
`\underset{i=1}{\overset{7}{\sum}} 3i`	$\underset{i=1}{\overset{7}{\sum}} 3i$

Limits

LaTeX	Result
`lim x^2`	$limx^2$
`\underset{x\rightarrow\infty}{lim} x^2`	$\underset{x\rightarrow\infty}{lim}\, x^2$
`\underset{x\rightarrow\infty}{\lim} x^2` `\lim is the same as \textrm{lim}`	$\underset{x\rightarrow\infty}{\lim}\, x^2$

Quotes

–Don't use "–

LaTeX	Result
`"Cubum autem in duos cubos"`	"Cubum autem in duos cubos"
``‘‘Hanc marginis’’``	“Hanc marginis”
`‘exiguitas non caperet’`	‘exiguitas non caperet’

Macros

```
\newcommand{\vadim}[1]{\underset{#1}{\sum}}
```

`\vadim{i\ge 0}` becomes $\underset{i\ge 0}{\sum}$

```
\newcommand{\newsum}[2]{\overset{#2}{\underset{#1}{\sum}}}
```

`\newsum{i=0}{5}` becomes $\overset{5}{\underset{i=0}{\sum}}$

'vadim' and 'newsum' are words of *my* choice

Parentheses

LaTeX	Result
`(([x+1]^2\{y+2\}^2)^2(z+3))^2`	$(([x+1]^2\{y+2\}^2)^2(z+3))^2$
`\bigg(\Big(\big[x+1\big]^2 \big\{y+2\big\}^2\Big)^2 (z+3)\bigg)^2`	$\bigg(\Big(\big[x+1\big]^2\big\{y+2\big\}^2\Big)^2(z+3)\bigg)^2$

Packages

`http://www.ctan.org`

Put `\usepackage{amsmath,fancybox}` before `\begin{document}`

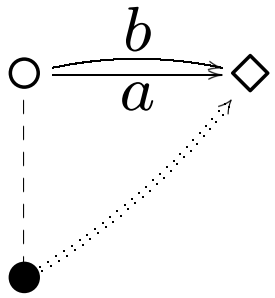
`amssymb` has things like $\therefore, \lesssim, \lneq, \nrightarrow, \hbar$

`amsmath` has things like $\boldsymbol{\mu}, \left(\begin{smallmatrix} a & b \\ c & d \end{smallmatrix}\right), \cfrac{1}{2+\cfrac{3}{4+\cdots}}$

`fancyhdr` for full control of headers, page numbers, and footers.

`fancybox` lets you do things like $\boxed{\text{this}}$, $\ovalbox{\text{this}}$, and $\Ovalbox{\text{this}}$.

xypic




```
\xymatrix{
\circ       \ar[r]_a     \ar@/^/[r]^b     & \diamond \\
*-{\bullet} \ar@{--}[u]  \ar@/_/@{:>}[ur]             }
```

BibTeX

```
Thanks to \cite{latex}, I love typesetting!
⋮
\bibliography{vadim} \bibliographystyle{plain}
```

---

vadim.bib contains:

```
@BOOK{latex,
   author = "Leslie Lamport",
   title = "{\LaTeX:} {A} Document Preparation System",
   publisher = "Addison-Wesley",
   year = 1986 }
```

BibTeX II

Entries for your bib file can be found at:
`http://www.ams.org/mathscinet/search`

To compile, you must LaTeX[1], BibTeX[2], LaTeX[3], LaTeX[4].

Once you've done this, then you can just LaTeX[3], LaTeX[4], unless you change your citations.

[1] Catches the citations
[2] Makes the bibliography
[3] Catches the labels
[4] Numbers the labels

Troubleshooting

Common warnings: underfull or overfull \hbox, undefined references, font substitutions

Common errors: mismatched $, {}, environments

Useful trick: comment out the problem, then reintroduce it a little at a time

Other Resources

The Not So Short Introduction to LaTeX2$_\epsilon$, Oetiker et al,
`http://people.ee.ethz.ch/~oetiker/lshort/`

Online Tutorial: `http://www.tug.org/tutorials/tugindia/`

Comprehensive TeX Archive Network: `http://www.ctan.org`

MiKTeX: `http://www.miktex.org`

WinEdt: `http://www.winedt.com`

TexShell: `http://www.projectory.de/texshell`