

The Joys of \LaTeX

A ≤ 45 minute lecture, with examples, introducing the world's standard typesetting language.

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<http://www-rohan.sdsu.edu/~vadim/latex-reu16.pdf>

<http://www-rohan.sdsu.edu/~vadim/latex-reu16.tex>



What is L^AT_EX?

L^AT_EX is not:

- Word processor
- Editor
- Computer program

L^AT_EX is:

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



Benefits

- Professional-looking output

Ligatures: of fluffing (MS Word) of fluffing (L^AT_EX)

Kerning: Table (MS Word) Table (L^AT_EX)

- math formulas, footnotes, references, tables of contents, indices, bibliographies, etc.
- Device and platform independent
- Text-based
- Encourages good organization
- Free



Benefits

- Professional-looking output

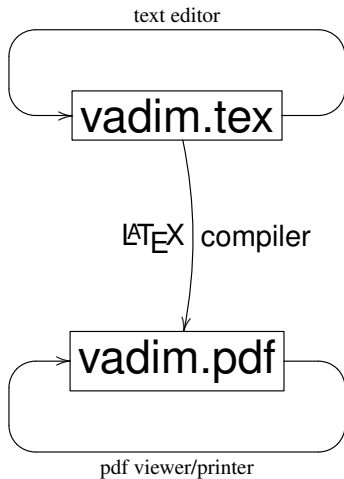
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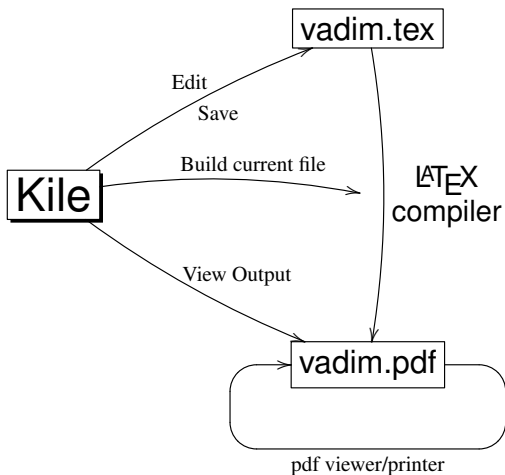
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Simplified Usage



Less Simplified Usage



Kile

The screenshot shows the Kile LaTeX editor window titled "test.tex - Kile". The interface includes a menu bar (File, Edit, View, Build, Project, LaTeX, Wizard, Bookmarks, Tools, Settings, Help), a toolbar with icons for file operations and editing, and a main text area containing LaTeX source code. A "Previous LaTeX BadBox" warning is visible in the toolbar area.

The source code in the main text area is as follows:

```

\section{Formulae; inline vs. displayed}

I insert an inline formula by surrounding it with a pair of
single \$ symbols; what is  $5x = 3 \times 55$ ?
For a \emph{displayed} formula, use double- $\$$ 
before and after --- include no blank lines!

$$55\mu^{(\alpha+3)} + (\alpha^{(\beta)}+\theta_{\gamma})+\delta+\zeta$$


\subsection{Numbered formulae}

Use the \emph{equation} environment to get numbered formulae, e.g.,
\begin{equation}
.
y_{i+1} = x_i^{2n} - \sqrt{5}x_{i-1}^n + \sqrt{x_{i-2}^7} - 1
\end{equation}
\begin{equation}
.
\frac{\partial u}{\partial t} + \nabla^4 u + \nabla^2 u +
\frac{1}{2} \nabla u^2 = -c^2
\end{equation}

\section{Acknowledgments}

```

Below the source code, there are tabs for "Log and Messages", "Output", "Console", and "Preview". The "View DVI" section shows "test.dvi (kdvi)" and "Done!". The status bar at the bottom indicates "Normal mode" and "Line: 15 Col: 11 INS NORM".



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.

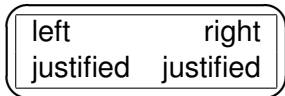
```
\end{document}
```

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

```
\usepackage{fancybox}
\begin{document}
\Ovalbox{
  \begin{tabular}{|lr|}
  \hline left & right \\
  justified & justified \\
  \hline \end{tabular}
}
\end{document}
not compiled
```



Example 3

Important equations can get a number and their own line:

```
\begin{equation} 3^{2^x} \geq \mu \end{equation}
 $x_1 > x_2 > \cdots, x_i \in \mathbb{R},$ 
 $\sqrt{\sqrt[3]{x}}, \sin x, \dots$ 
```

Important equations can get their a number and own line:

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

$$x_1 > x_2 > \cdots, x_i \in \mathbb{R}, \sqrt{\sqrt[3]{x}}, \sin x, \dots$$



Example 4

```
\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.



Example 5

```

 $\sum_{i=1}^7 3i$  \hspace{1in}
 $\underset{i=1}{\overset{7}{\sum}} 3i$  \hspace{1in}
 $\underset{x\to\infty}{\lim} x^2$  \\
\vspace{3.6mm}

 $\displaystyle \lim_{x\to\infty}$ 

```

$$\sum_{i=1}^7 3i$$

$$\sum_{i=1}^7 3i$$

$$\lim_{x \rightarrow \infty} x^2$$

Use ‘ and ’; avoid the sweet temptation of "

Other units: in, cm, pt, weird ones like bp (=1.00375pt),

\textwidth , \pagewidth



Example 6

```
\section{Introduction}\label{yes_you_can}  
\subsection{Numbered}  
\subsection*{Not Numbered}  
\subsubsection{You don't need these}  
\newcommand{\vadam}[2]  
{\overset{#2}{\underset{#1}{\sum}}}  
$\left( \vadam{i=0}{5} \right) \!\!\!\! \!x$
```

$$\left(\sum_{i=0}^5 \right) x$$



Basics

- Always load:
`amsmath, amsthm, amssymb, amsfonts`
- Often useful: `fullpage`
- All packages at: <http://www.ctan.org>



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Including Graphics

- Use package `graphicx` (not needed with Beamer), and LaTeX => PDF.

- For raster images (png, jpg, gif) and pdf, use:

```
\includegraphics[width=2in]{vadims_image}
```

No extension needed, the wrong file is picked automatically

- For vector images, convert eps to pdf using `epstopdf`.
- If it didn't work, or is misaligned, prepare to waste an afternoon. Try: `minipage`, `raisebox`, `figure`



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Beamer

- Packages `latex-beamer`, `pgf`, `xcolor` must be installed.
- Pick a theme, e.g. `Singapore`
- Most \LaTeX commands unchanged, some new ones (e.g. `\pause`)
Find other people's code and steal it.
- Manual available at:
<http://www.ctan.org/tex-archive/macros/latex/contrib/beamer/doc/beameruserguide.pdf>



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BibTeX

```
\cite{lamport}
\bibliography{vadim} \bibliographystyle{plain}
```

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

<http://www.ams.org/mathscinet/search>



Other Resources

The Not So Short Introduction to $\text{\LaTeX}2\epsilon$, Oetiker et al,
<http://tobi.oetiker.ch/lshort/lshort.pdf>

Online tutorial:

<http://www.tug.org/tutorials/tugindia/>

Mac users:

[http://www.cs.wright.edu/~jsslater/mac-tex/
mac-tex-intro/mactexintro.html](http://www.cs.wright.edu/~jsslater/mac-tex/mac-tex-intro/mactexintro.html)

