The Joys of LaTeX

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

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http://vadim.sdsu.edu/latex-reu19.pdf
http://vadim.sdsu.edu/latex-reu19.tex

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What is 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

  Ligatures: of fluffing (MS Word) of fluffing (LaTeX)

  Kerning: Table (MS Word) Table (LaTeX)

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

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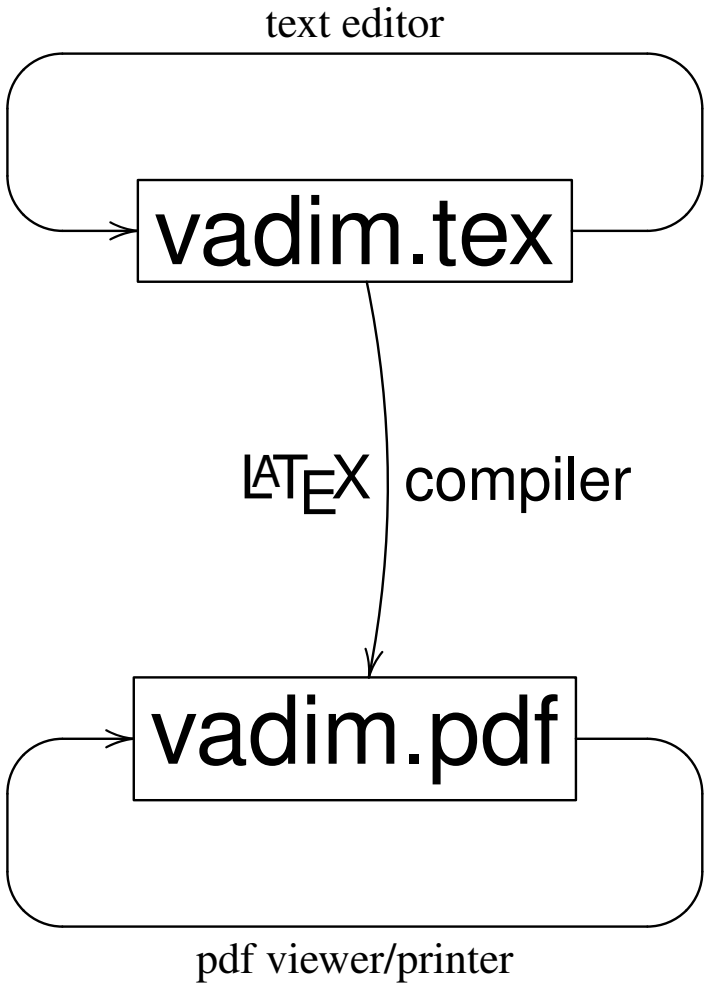
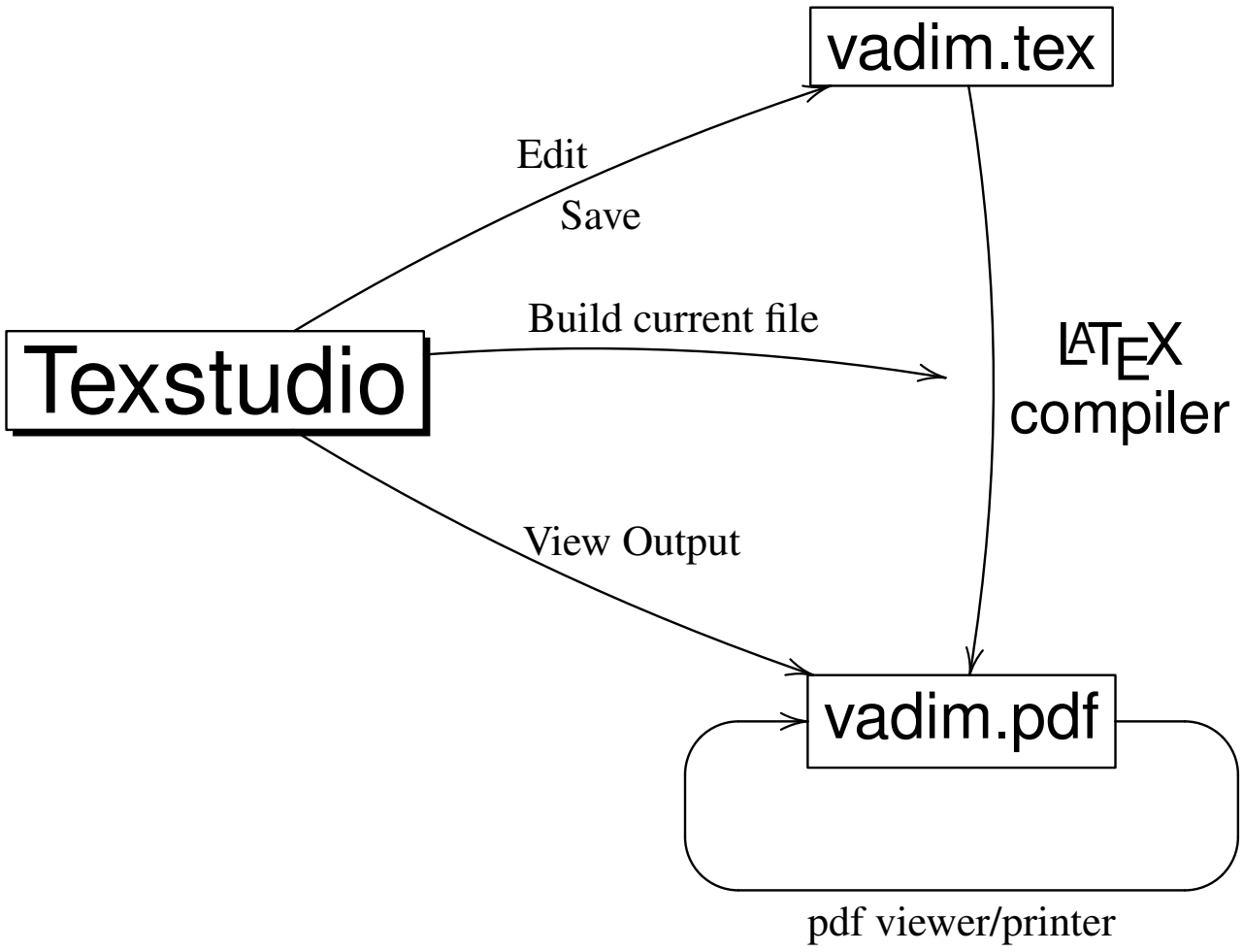
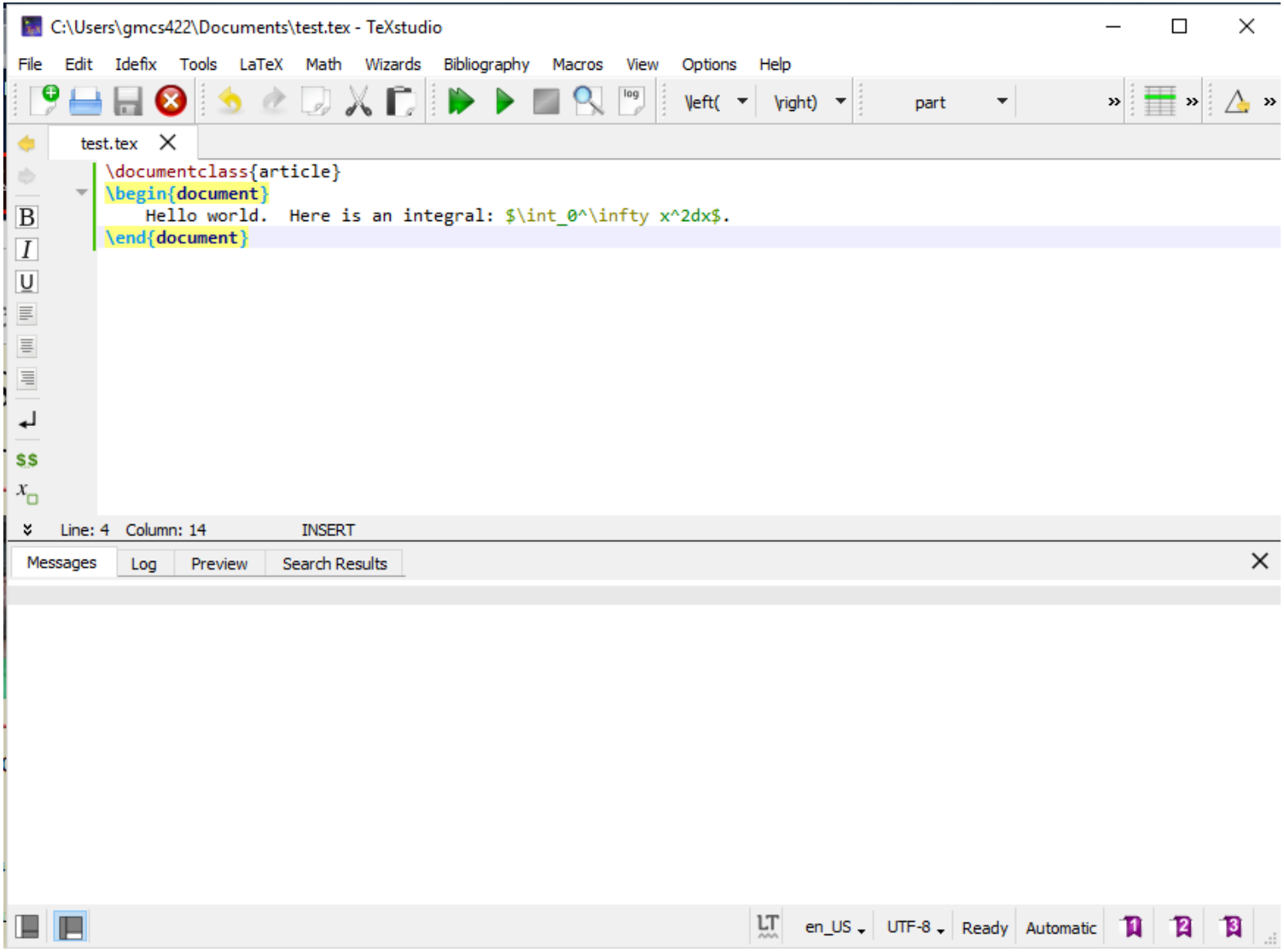
Simplified Usage



Less Simplified Usage



Texstudio


C:\Users\gmcs422\Documents\test.tex - TeXstudio
File Edit Idefix Tools LaTeX Math Wizards Bibliography Macros View Options Help
\left(\right) part
test.tex
\documentclass{article}
\begin{document}
Hello world. Here is an integral: $\int_0^\infty x^2dx$.
\end{document}
Line: 4 Column: 14 INSERT
Messages Log Preview Search Results
en_US UTF-8 Ready Automatic

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
```

---

left	right
justified	justified

Example 3

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

Important equations can get their a number and own line:

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

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

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.

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Example 5

```
$\sum_{i=1}^73i \hspace{1in}
\underset{i=1}{\overset{7}{\sum}}3i \hspace{1in}
\underset{x\to\infty}{\lim} x^2$\\
\vspace{3.6mm}

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

$\sum_{i=1}^7 3i$ $\displaystyle\sum_{i=1}^{7}3i$ $\displaystyle\lim_{x\to\infty} x^2$

Use ‘ and ’; avoid the sweet temptation of "

Other units: `in, cm, pt, weird ones like bp`(=1.00375pt), `\textwidth, \pagewidth`

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Example 6

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

$$\left(\overset{5}{\underset{i=0}{\sum}}\right)x$$

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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:
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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 }
```

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

Other Resources

The Not So Short Introduction to LaTeX2ϵ, 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/~jslater/mac-tex/mac-tex-intro/mactexintro.html`