Introduction to \LaTeX, part II

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Department of Mathematics
University of Florida
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LAST WEEK...
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- Document structure
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- Math mode
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- Errors

Everything from last week (including the slides and their source) is on the Graduate Mathematics Association website: gma.math.ufl.edu/latex-seminar/.
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- Math mode
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- Article Formatting
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- Drawing Figures (TikZ)
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- Article Formatting
- Bibliographies
- Drawing Figures (TikZ)
- Slides (Beamer)
Types of Commands

Last week we learned about different types of commands.
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- Some have no arguments: \(\alpha\) → \(\alpha\)
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- Some have no arguments: $$\alpha$$

- Some have arguments: $$\frac{a}{b}$$
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Last week we learned about different types of commands.

- Some have no arguments: $\alpha$
- Some have arguments: $\frac{a}{b}$
- Some have optional arguments: $\sqrt[n]{x}$
USER-DEFINED COMMANDS

You can define your own commands (also known as macros) in the preamble using the \newcommand command.
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Format:

```
\newcommand{\yourcommandname}{[what it does]}
```
USER-DEFINED COMMANDS

You can define your own commands (also known as *macros*) in the preamble using the `\newcommand` command.

Format:

```
\newcommand{\yourcommandname}{[what it does]}
```

Stupid example:

```
\newcommand{\me}{jay}
```

Now, we can use `\me` $\rightarrow$ `jay`. 
LESS STUPID EXAMPLE

The symbol $\setminus$ is created by $\smallsetminus$, which is a lot of typing. We need a shortcut.
**Less Stupid Example**

The symbol \( \setminus \) is created by \( \texttt{\smallsetminus} \), which is a lot of typing. We need a shortcut.

\[
\texttt{\newcommand{\ssm}{\smallsetminus}}
\]
**LESS STUPID EXAMPLE**

The symbol $\setminus$ is created by $\textbackslash\text{smallsetminus}$, which is a lot of typing. We need a shortcut.

\[
\texttt{\newcommand{\smallsetminus}{\textbackslash\text{smallsetminus}}} \\
\]

A $\texttt{\smallsetminus}$ B $\rightarrow$ $A \setminus B$
User-defined commands can take arguments. This command shortens the name of \xrightarrow and adds spacing.
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\newcommand{\xto}[1]{\xrightarrow{\;\;\;\#1\;\;\;}}
**USEFUL EXAMPLE**

User-defined commands can take arguments. This command shortens the name of `\xrightarrow` and adds spacing.

\[
\texttt{\newcommand{\xto}[1]{\xrightarrow{\,\,;\,\,#1\,\,;\,}}}
\]

Let’s break the parts down:
USEFUL EXAMPLE

User-defined commands can take arguments. This command shortens the name of \xrightarrow and adds spacing.

\newcommand{\xto}[1]{\xrightarrow{\;\;\;\{#1\}\;\;\;}}

Let’s break the parts down:
• [1] is the number of arguments
**USEFUL EXAMPLE**

User-defined commands can take arguments. This command shortens the name of \texttt{xrightarrow} and adds spacing.

\begin{verbatim}
\newcommand{\xto}[1]{\xrightarrow{\;\;\;\;\;\;\;\;\{#1\}\;\;\;\;\;\;\;}}
\end{verbatim}

Let’s break the parts down:

- [1] is the number of arguments
- \{#1\} inserts the given argument
User-defined commands can take arguments. This command shortens the name of $\xrightarrow{}$ and adds spacing.

\begin{verbatim}
\newcommand{\xto}[1]{\xrightarrow{} \mbox{\scriptsize \textit{#1}}} 
\end{verbatim}

Let’s break the parts down:

- [1] is the number of arguments
- \{#1\} inserts the given argument
- \; adds a small space
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Let’s break the parts down:

- [1] is the number of arguments
- \{#1\} inserts the given argument
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**REALLY USEFUL EXAMPLE**

Arrays take a lot of typing.
**Really Useful Example**

Arrays take a lot of typing.

\[
\begin{pmatrix}
1 & -1 \\
2 & 0
\end{pmatrix}
\Rightarrow \begin{pmatrix}
1 & -1 \\
2 & 0
\end{pmatrix}
\]
REALLY USEFUL EXAMPLE

Arrays take a lot of typing.

Let's make a macro.
**Really Useful Example**

Arrays take a lot of typing.

\[
\left(\begin{array}{rr}
1 & -1 \\
2 & 0 \\
\end{array}\right)
\]

Let’s make a macro.

\[
\text{\texttt{newcommand\{\texttt{arr}\}[4] \{ \\
\texttt{left(\texttt{begin\{array\}{rr}} \{ #1 \} & \{ #2 \} \\
\{ #3 \} & \{ #4 \} \\
\texttt{end\{array\}\right)} \\
\}}}
\]
**Really Useful Example**

Let’s make a macro.

\begin{verbatim}
\newcommand{\arr}[4]{
    \left(\begin{array}{rr}
        \#1 & \#2 \\
        \#3 & \#4
    \end{array}\right)
}
\end{verbatim}

Now we can make arrays much quicker.

$$\arr{\pi}{e}{\gamma}{1}$$
REALLY USEFUL EXAMPLE

Let’s make a macro.

\[ \texttt{\newcommand{\arr}[4]}{\left( \texttt{\begin{array}{rr} \texttt{#1} & \texttt{#2} \\ \texttt{#3} & \texttt{#4} \end{array}} \right) } \]

Now we can make arrays much quicker.

\[ \texttt{\arr{\pi}{e}{\gamma}{1}} \implies \left( \begin{array}{c} \pi \\ \gamma \\ 1 \end{array} \right) \]
\LaTeX makes it easy to format an article by
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- handling footnotes,
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\begin{itemize}
  \item formatting a title page
  \item automatic numbering
  \item creating a table of contents
  \item tracking references
  \item handling footnotes, figures,
\end{itemize}
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BIBLIOGRAPHIES

There are two ways to do bibliographies:

§ Old school: enter each item in the proper bibliographical format, and reference it where needed.
§ New school: use BibTeX to generate the entries for you.
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TikZ

TikZ is a (recursive) acronym for the German phrase

\textit{TikZ ist \textit{kein} Zeichenprogramm}
TikZ

TikZ is a (recursive) acronym for the German phrase TikZ ist kein Zeichenprogramm

which translates to

TikZ is not a drawing program.
TikZ

TikZ is a (recursive) acronym for the German phrase

TikZ ist *kein* Zeichenprogramm

which translates to

TikZ is *not* a drawing program.

(Hint: TikZ *is* a drawing program.)
TikZ

TikZ has a *ton* of extensions that let you draw almost anything.
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SUMMARY

You can do almost anything with \LaTeX if you can find the right packages or document classes.
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Pick a project and just keep trying until it works.
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Google!
Thanks for coming. Any questions?