An Interactive Introduction to \LaTeX
Part 3: Not Just Papers: Presentations & More

Enrico Franconi
(from: John Lees-Miller)

\textit{write\LaTeX}
**LaTeX Recap**

- You write your document in plain text with commands that describe its structure and meaning.
- The LaTeX program processes your text and commands to produce a beautifully formatted document.

```
\textit{The rain in Spain falls \textit{mainly} on the plain.}
```

The rain in Spain falls *mainly* on the plain.
LaTeX Recap: Commands & Arguments

- A command starts with a `backslash` `\`.
- Some commands take an `argument` in curly braces `{}`.
- Some commands also take `optional arguments` in square brackets `[ ]`.

\includegraphics[width=0.5\textwidth]{big_chick}
\includegraphics[width=0.3\textwidth, angle=270]{big_chick}
The \texttt{\begin} and \texttt{\end} commands are used to create many different environments — contexts.

The \texttt{itemize} and \texttt{enumerate} environments make lists.

\begin{itemize}
\item Biscuits
\item Tea
\end{itemize}

\begin{enumerate}
\item Biscuits
\item Tea
\end{enumerate}
The equation environment makes a numbered equation.

\begin{equation}
\sum_{k=1}^{n} \frac{1}{2^k} \tag{1}
\end{equation}

Use dollar signs \$ to mark mathematics in text.

\begin{tabular}{l|l}
\% not so good:  & \% much better:  \\
Let a and b be distinct positive integers, and let c = a - b + 1. & Let $a$ and $b$ be distinct positive integers, and let $c = a - b + 1$.  \\
\end{tabular}

In fact, we could have written $\ldots$ as \begin{math} \ldots \end{math}.  

Always use dollar signs in pairs — one to begin the mathematics, and one to end it.
\texttt{\LaTeX} Recap: Document Structure

- Starts with the \texttt{\documentclass} — what type of document.
- Metadata (\texttt{\title} and \texttt{\author}) and packages in the preamble.
- Content between \texttt{\begin{document}} and \texttt{\end{document}}.
- The \texttt{\maketitle} command creates the title; \texttt{\section} commands create numbered sections.

\begin{verbatim}
\documentclass{article}
% preamble
\title{The Title}
\author{A. Author}

\begin{document}
% body
\maketitle

\section{Introduction}

In this paper we \ldots

\end{document}
\end{verbatim}
\textbf{\LaTeX} Recap: Exercise

1. Here is the text for a short article:\textsuperscript{1}

\begin{quote}
Click to open this exercise in write\LaTeX
\end{quote}

2. Add \LaTeX\ commands to the text to make it look like this one:

\begin{quote}
Click to open the model document
\end{quote}

\textbf{Hints}

\begin{itemize}
\item Use the enumerate and itemize environments for lists.
\item To typeset a \% percent sign, \textit{escape} it with a backslash (\%).
\item To typeset the equation, use \texttt{\frac} for the fraction and the \texttt{\left(} and \texttt{\right)} commands for the parentheses.
\end{itemize}

\textsuperscript{1}Based on http://www.cgd.ucar.edu/cms/agu/scientific_talk.html
Presentation with beamer

- Beamer is a package for creating presentations (such as this one!) in \LaTeX.
- It provides the `beamer` document class.
- Use the `frame` environment to create slides.

```latex
\documentclass{beamer}
\title{Welcome to Beamer}
\author{You}
\institute{Where You're From}
\date{Date of Presentation}
\begin{document}
\begin{frame}
\titlepage % beamer's \maketitle
\end{frame}
\end{document}
```
Presentations with beamer: Following Along

- As we go through the following slides, try out the examples by typing them into the example document on write\LaTeX.

Click to open the example document in write\LaTeX.
Presentations with beamer: Frames

- Use \texttt{\frametitle} to give the frame a title.
- Then add content to the frame.
- The source for this frame looks like:

\begin{frame}
\frametitle{Presentations with beamer: Frames}
\begin{itemize}
  \item Use \texttt{\frametitle} to give the frame a title.
  \item Then add content to the frame.
  \item The source for this frame looks like ...
\end{itemize}
\end{frame}
Presentations with \textit{beamer}: Sections

- You can use \texttt{\textbackslash\texttt{sections}} to group your frames, and \textit{beamer} will use them to create an automatic outline.
- To generate an outline, use the \texttt{\textbackslash\texttt{tableofcontents}} command. Here's one for this presentation. The \texttt{\texttt{currentsection}} option highlights the current section.

\begin{verbatim}
\tableofcontents[\texttt{currentsection}]
\end{verbatim}

\texttt{\LaTeX} Recap
\begin{itemize}
  \item Presentations with \textit{beamer}
  \item Drawings with \textit{TikZ}
  \item Notes with \textit{todonotes}
  \item Spreadsheets with \textit{spreadtab}
\end{itemize}
Presentations with beamer: Multiple Columns

- Use the `columns` and `column` environments to break the slide into columns.
- The argument for each column determines its width.
- See also the `multicol` package, which automatically breaks your content into columns.

```latex
\begin{columns}
  \begin{column}{0.4\textwidth}
    \begin{itemize}
      \item Use the columns ...
      \item The argument ...
      \item See also the ...
    \end{itemize}
  \end{column}
  \begin{column}{0.6\textwidth}
    % second column
  \end{column}
\end{columns}
```
Presentations with beamer: Highlights

- Use \texttt{\textbf{emph}} or \texttt{\textbf{alert}} to highlight:

  I should \texttt{emph}{emphasise} that this is an \texttt{alert}{important} point.  
  I should \texttt{emphasise} that this is an \texttt{important} point.

- Or specify bold face or italics:

  Text in \texttt{\textbf{bold face}}.
  Text in \texttt{\textit{italics}}.

  Text in \texttt{\textbf{bold face}}. Text in \texttt{\textit{italics}}.

- Or specify a color (American spelling):

  It \texttt{\textcolor{red}{textcolor}}{stops} and \texttt{\textcolor{green}{textcolor}}{starts}.

  It stops and starts.

Presentations with \texttt{beamer}: Figures

- Use \texttt{\includegraphics} from the graphicx package.
- The \texttt{figure} environment centers by default, in \texttt{beamer}.

\begin{figure}
\includegraphics[width=0.5\textwidth]{big_chick}
\end{figure}
Presentations with \texttt{beamer}: Tables

- Tables in \LaTeX take some getting used to.
- Use the \texttt{tabular} environment from the \texttt{tabularx} package.
- The argument specifies column alignment — \texttt{left}, \texttt{right}, \texttt{right}.

\begin{tabular}{lrr}
  \textbf{Item} & \textbf{Qty} & \textbf{Unit} \\
  Widget & 1 & 199.99 \\
  Gadget & 2 & 399.99 \\
  Cable & 3 & 19.99 \\
\end{tabular}

- It also specifies vertical lines; use \texttt{\hline} for horizontal lines.

\begin{tabular}{|l|r|r|} \hline
  \textbf{Item} & \textbf{Qty} & \textbf{Unit} \\
  Widget & 1 & 199.99 \\
  Gadget & 2 & 399.99 \\
  Cable & 3 & 19.99 \\
\end{tabular}

- Use an ampersand \& to separate columns and a double backslash \\ to start a new row.
Presentations with beamer: Blocks

- A block environment makes a titled box.

\begin{block}{Interesting Fact}
This is important.
\end{block}

\begin{alertblock}{Cautionary Tale}
This is really important!
\end{alertblock}

- How exactly they look depends on the theme...
Presentations with beamer: Themes

- Customise the look of your presentation using themes.

\documentclass{beamer}
\usetheme{Darmstadt}
\usecolortheme{beetle}
\title{Theme Demo}
\author{John}
\begin{document}
\begin{frame}
\titlepage
\end{frame}
\end{document}
Presentations with beamer: Animation

- A frame can generate multiple slides.
- Use the \pause command to show only part of a slide.

\begin{itemize}
  \item Can you feel the \pause \item anticipation?
\end{itemize}

- Can you feel the
Presentations with beamer: Animation

- A frame can generate multiple slides.
- Use the \texttt{\textbackslash pause} command to show only part of a slide.

\begin{itemize}
\item Can you feel the \texttt{\textbackslash pause \texttt{\textbackslash item} anticipation?}
\end{itemize}

- There many more clever ways of making animations in beamer; see also the \texttt{\textbackslash only}, \texttt{\textbackslash alt}, and \texttt{\textbackslash uncover} commands.
Presentations with beamer: Exercise

Recreate Peter Norvig’s excellent “Gettysburg Powerpoint Presentation” in beamer.²

1. Open this exercise in write\LaTeX:

   ![Click to open this exercise in write\LaTeX](http://norvig.com/Gettysburg)

2. Download this image to your computer and upload it to write\LaTeX via the files menu.

   ![Click to download image](http://norvig.com/Gettysburg)

3. Add \LaTeX commands to the text to make it look like this one:

   ![Click to open the model document](http://norvig.com/Gettysburg)

²http://norvig.com/Gettysburg
Drawings with TikZ

- TikZ is a package for drawing figures in \LaTeX.
- It defines a powerful drawing language inside \LaTeX. Short programs can draw surprisingly complicated things.

We’ll start with simple things. To draw a line in TikZ:

\begin{tikzpicture}
\draw (0,0) -- (1,1); % a line
\end{tikzpicture}
Drawings with Ti\textit{k}Z: Coordinates

- The default coordinates are centimeters, with the usual sense:

\begin{align*}
(0, 3) & \quad (3, 3) \\
(0, 0) & \quad (3, 0)
\end{align*}

- It helps to draw a grid when you are working with Ti\textit{k}Z:

\begin{tikzpicture}
\draw[help lines] (0,0) grid (3,3);
\end{tikzpicture}
Drawings with TikZ: Lines

- Arrow heads and line styles are specified as options to the `\draw` command.
- End each draw command with a `;` semicolon.

```latex
\begin{tikzpicture}
\draw[help lines] (0,0) grid (3,3);
\draw[->] (0,0) -- (1,1);
\draw[<->, thick] (2,1) -- (1,2);
\draw[<-, thick, dashed] (2,2)--(3,3);
\end{tikzpicture}
```
Drawings with TikZ: Paths

- You can specify multiple points to form a path.
- Arrows will appear only at the ends of the path.

```latex
\begin{tikzpicture}
\draw[help lines] (0,0) grid (3,3);
\draw[<->, thick] (0,3)--(0,0)--(3,0);
\draw (1.5,0.5) -- (2.5,1.5) --
(1.5,2.5) -- (0.5,1.5) --
cycle; % close the path
\end{tikzpicture}
```
Drawings with TikZ: Colours

Colours are also specified as options to `\draw`.

```latex
\begin{tikzpicture}
\draw[help lines] (0,0) grid (3,3);
% axes
\draw[<->, thick, red] (0,3)--(0,0)--(3,0);
% diamond
\draw[thick, blue, fill=yellow]
  (1.5,0.5) -- (2.5,1.5) --
  (1.5,2.5) -- (0.5,1.5) --
cycle;
\end{tikzpicture}
```
Drawings with TikZ: Shapes

- TikZ has built-in commands for simple shapes.

\begin{tikzpicture}
\draw[help lines] (0,0) grid (3,3);
\draw (1.5,2.0) circle (0.5);
\draw (0.5,0.5) rectangle (2.5,1.5);
\end{tikzpicture}
Drawings with TikZ: Nodes & Labels

- Use nodes to place text (and math) in TikZ drawings.
- You can also use nodes as coordinates — useful for diagrams.

\begin{tikzpicture}
\draw[help lines] (0,0) grid (3,3);
\node (h) at (0,0) {H};
\node (x) at (1.5,1.5) {$\xi$};
\node (t) at (3,0) {T};
\draw[->] (x) -- (h);
\draw[->] (x) -- (t);
\end{tikzpicture}
You can even plot some simple functions.

\begin{tikzpicture}[scale=0.5]
% y axis
\draw[<->, thick] (0,2) -- (0,-2);
% x axis
\draw[->, thick] (0,0) -- (7, 0);
% curves
\draw[cyan,domain=0:2*pi]
  plot (\x, {sin(\x r)});
\draw[magenta,domain=0:2*pi]
  plot (\x, {cos(\x r)});
\end{tikzpicture}
Drawings with TikZ: Examples

▶ Check out \texttt{TEXample.net} for many TikZ examples:
Drawings with Ti\textit{k}Z: Exercise

Draw this in Ti\textit{k}Z:\textsuperscript{3}

So it has come to this.

\textsuperscript{3}Based on http://xkcd.com/1022
Notes with todonotes

- The \texttt{\textbackslash todo} command from the todonotes package is great for leaving notes to yourself and your collaborators.

\begin{itemize}
  \item \texttt{\textbackslash todo\{add results\}}
  \item \texttt{\textbackslash todo\{color=blue!20\}\{fix method\}}
\end{itemize}

Pro Tip: define your own commands with \texttt{\textbackslash newcommand}

\begin{itemize}
  \item \texttt{\textbackslash newcommand\{\texttt{\textbackslash alice}\}[1]\{\texttt{\textbackslash todo\{color=green!40\}\{#1\}\}}}
  \item \texttt{\textbackslash newcommand\{\texttt{\textbackslash bob}\}[1]\{\texttt{\textbackslash todo\{color=purple!40\}\{#1\}\}}}
\end{itemize}

This can save a lot of typing:

\begin{itemize}
  \item \texttt{\textbackslash alice\{add results\}}
  \item \texttt{\textbackslash bob\{fix method\}}
\end{itemize}
Towards the Confusing Unification of Rasterization and Local-Area Networks in State Machines

Alice Bob, Carol David, Edward Fredrick

Abstract

Rasterization and Smalltalk, while important in theory, have not until recently been considered important. Given the current status of wearable methodologies, analysts clearly desire the refinement of IPv4. Purr, our new heuristic for the producer-consumer problem \[1\], is the solution to all of these problems.

1 Introduction

Recent advances in certifiable symmetries and Bayesian technology synchronize in order to realize access points. This is a direct result of the construction of multicast algorithms. This is a direct result of the analysis of active networks. The emulation of suffix trees would profoundly improve congestion control \[4\].

To our knowledge, our work in our research marks the first method analyzed specifically for scalable models. Existing interactive and permutable methodologies use Smalltalk to measure the construction of the partition table. The disadvantage of this type of method, however, is that hash tables can be made real-time, cooperative, and reliable. Existing “fuzzy” and concurrent algorithms use the evaluation of multicast frameworks to request access points. On the other hand, distributed archetypes might not be the...
Spreadsheets with \texttt{spreadtab}

- Now that you’ve seen how \LaTeX\ can replace Word and PowerPoint, what about Excel?
- Homework: try the \texttt{spreadtab package}!
Thanks, and happy \TeXing!