LaTeX Workshop Handout

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1   Introduction

- What is LaTeX? A document mark-up *language*, not to be confused with whichever text editing environment you use (e.g., TeXstudio). It is a collection of TeX macros.

- Why use it? Easy to learn, many tasks are taken care of *automatically*, can be *flexible* but remains *predictable*, *consistent* no matter what you use to edit your .TeX files (completely unlike proprietary formats), easy to incorporate high-quality graphics, extremely *well documented*, etc.

- Installing LaTeX. `http://en.wikibooks.org/wiki/LaTeX/Installation`. Windows users, MiKTeX is great; Linux or Mac users (or Windows — it's cross platform), TeX Live; Mac users may also use MacTeX. Not sure you want to install it yet? Try `https://www.writelatex.com/` or use the linguistics lab computers.

2   Basics

2.1   Making a document

- The "preamble": **The preamble** is the space before the document beginning where you to set some global parameters of your document and call *packages*.

- `\documentclass[12pt]{article}`: A **\documentclass** is required in the preamble. You provide it with one obligatory {argument}, in this case it is *article*, and [options] like the size of your main document's typeface are . . . optional.

- `\begin{document}` . . . your content . . . `\end{document}`: **Begin and end your document** and everything in-between (your content!).

2.2   Syntax

- Spaces: Stretches of white space = one space. Empty lines (made by double-spacing) start new paragraphs. Use \ for a single space or to allow line-breaks (or ∼ to prevent a line break) and \\ for line breaks.

- Special characters: # $ % ^ & _ { } ~ \. In particular, % is useful because it allows you to make comments that won't appear in the typeset version.

- Groups: Limits the range of commands to the content within a pair of braces. For example, {\bf This text is in boldface} gives **This text is in boldface**.

- Environments: Perform a function similar to groups and are defined by a \begin{} command and an \end{} command where text within the environment is affected by the particular command.

- Commands: Always start with a \ and can take arguments in {} and options (separated by commas) in [ ].

3 Packages

LaTeX is improved by the use of packages which are a lot like packages for R; they permit new functionalities via pre-defined macros and their numbers are extensive. If there's a feature you find lacking in your set-up of LaTeX, simply use a Google search to find the appropriate package.

- \usepackage[option1, option2, ... option_n]{packagename}.

- Some useful ones are tipa, geometry, and graphicx.

- For writing in languages other than English, use the babel package.

- Your LaTeX compiler, e.g. MiKTeX, automatically downloads and installs packages "on the fly" from a repository.

3.1 Defining new commands

Some useful new commands for the tipa package can be defined to make entering IPA characters even easier. Simply define the following commands in your preamble[1]:

```
\newcommand{\ipa}[1]{\textipa{#1}}
\newcommand{\ips}[1]{$/$\textipa{#1}$/$}
\newcommand{\ip}[1]{\textipa{[#1]}}
```

You can use these commands to produce the following sample output:

/trænskrɪpʃən/
træn.skrɪp.ʃən
[tʃɹæ̀n.skɹíp.ʃn̩]

From this input:

---

[1]New commands borrowed from U Ottawa Linguistics LaTeX workshop handout. Thanks to Jeff Mielke for sharing.

```
\noindent \ips{tr\ae{}nskrIpS@n} \\
\ipa{tr\ae{}n.skrIp.S@n} \\
\ip{tS\r*{\*r}\'{\~{\ae{}}}n.sk\*r\'{I}p.S\s{n}}
```

4 Document organization

- **Top matter** includes `\author{}`, `\title{}`, and `\date{}` which can be declared in the *preamble*.

- Tell LaTeX to typeset your **title** by placing `\maketitle` immediately following your `\begin{document}` command. Notice that this ensures that the title is in the *document environment*!

- **Sectionizing** your paper is simple. Use the `\section{Section title}` command. For example, this section is `\section{Document organization}`.

  If your section title is long and you refer to it later in-text, use its [option] to declare a short title.

  Other "sections": `\paragraph{}`, `\subsection{}`, `\chapter{}`, etc.

- **Lists** are organizing environments which are marked by `items`. Lists, which can be nested, include:
  ```
  \begin{enumerate, itemize, or description}
      \item enumerate = numbered list
      \item itemize = bulleted list
      \item description is a little different ...
  \end{enumerate, itemize, or description}
  ```

- **Bibliography**: Advanced topic!

5 Tables

- **Tables** are made by declaring a `tabular` environment with this command format `\begin{tabular}[pos]{table spec}`.

- Within **table spec**, you can have `l` (left-justified column), `c` (centered column), `p{'width'}` (paragraph column with text aligned at top), `|` for a vertical line and `||` for a double verticle line.

- **pos** is an optional command specifying the position of the table (`b` = bottom, `t` = top, `c` = center (the default)).

- **Separation**: `&` is the column separator, `\\` starts a new row, `\hline` is a horizontal line, and `\cline{i-j}` is a horizontal line starting at column i and ending at column j.

- Tables can be tricky; see `http://en.wikibooks.org/wiki/LaTeX/Tables` for some additional examples.

Example of a table output:

Item		
Animal	Description	Price ($)
Gnat	per gram	13.65
	each	0.01
Gnu	stuffed	92.50
Emu	stuffed	33.33
Armadillo	frozen	8.99

Example table in LaTeX:

```
\begin{center}
\begin{tabular}{llr}
\hline
\multicolumn{2}{c}{Item} \\
\cline{1-2}
Animal    & Description & Price (\$) \\
\hline
Gnat      & per gram    & 13.65      \\
          & each        & 0.01       \\
Gnu       & stuffed     & 92.50      \\
Emu       & stuffed     & 33.33      \\
Armadillo & frozen      & 8.99       \\
\hline
\end{tabular}
\end{center}
```

- You may want to treat your tables as **floats**. If so, put it in a `\begin{table}` environment.

- There is a package for R called `stargazer` which takes summary output from a statistical model and automatically produces LaTeX code for you to make a nice-looking table.

6 Graphics

- To incorporate graphics (PNG, JPG, PDF, or EPS using the `epstopdf` package) into your document, you have to use the `graphicx` package; remember to declare it in your preamble.

- The command takes the form `\includegraphics[attr1=val1]{imagename}`.

- You can specify attributes like width (`width = \textwidth`), height (`height = 4cm`), scaling (`scale = scale factor`), trim the image (`trim = l b r t`), clip (`clip = TRUE` for trimmed images), or select a page from a multi-page PDF (`page = #`).

- Do NOT use spaces in figure names and give preference to vector graphics over raster graphics. There's no reason not to export your R figures as PDFs.

- Keep your figures in the same folder/directory as your .TEX files.

- Graphics are usually treated as **floats** using a `\begin{figure}` environment:

```
\begin{figure}[h] \centering % h means ''here''
\includegraphics{image.png}
\caption{A nice caption}
\label{fig:nice_image}
\end{figure}
```

7 Fine details worth mentioning

- " and " are two different characters even though most WYSIWYG editors don't make a distinction. In the spirit of LaTeX, you won't be surprised that you have to use `''` for left quotes and `''` for right quotes.

- `On the 8\textsuperscript{th} day` produces "On the 8th day."

- Use `mathmode` for subscripts, e.g., `H$_2$O is water` produces "H_2O is water."

- Hyphen = `-`; en dash = `--`, em dash = `---`.

- Ellipsis = `\ldots` produces . . .

- **Escaped codes** can be used for additional special characters. For example, to produce accents and other diacritics. `Fran\c{c}ais` produces Français and `\'{e}crit` gives écrit. Lots of special characters are available in the `tipa` package.

- `\verb|verbatim content|` lets you write **verbatim** (you can also use the environment `\begin{verbatim} ... \end{verbatim}` command) where the "pipe" can be replaced by almost any delimiting character except *.

- Other tricks are on your LaTeX cheat sheets.

8 Miscellaneous help

- Understanding LaTeX compilation errors: `http://en.wikibooks.org/wiki/LaTeX/Errors_and_Warnings`.

- LaTeX for linguistics: `http://en.wikibooks.org/wiki/LaTeX/Linguistics`.

- The smartphone application `detexify` lets you draw characters to find matching symbols (includes `tipa` and other package-specific symbols). You can use a web-based version here `http://detexify.kirelabs.org/classify.html`.

9 Advanced topics!

9.1 Beamer for presentation slides

- There is also a LaTeXbased solution for creating slides for presentations (i.e., like MS PowerPoint) called `beamer`. Beamer is a package which you call using `\documentclass{}`. See an example at: `https://www.writelatex.com/templates/2`.

- For more information, see `http://en.wikibooks.org/wiki/LaTeX/Presentations`.

9.2 LaTeX for other document types

You can use LaTeX for just about anything, but other useful documents (aside from articles, papers, drafts, squibs, etc.) include posters for conference presentations, CVs, handouts, etc.

9.3 Bibliography management

- One of the best features of LaTeX is its reference management using BibTeX. With a simple key, you won't have to worry about formatting or thinking too much about matching in-text citations to your reference list, etc.

- You can automatically create reference keys using software like `Mendeley` or `JabRef`; there are many others; these are just the ones I use.

- For information about how to manage bibliographies/references and in-text citations ee `http://en.wikibooks.org/wiki/LaTeX/Bibliography_Management`.

This LaTeX code produces the Reference list at the end of this document:

```
\begin{thebibliography}{9}

\bibitem{lamport94}
  Leslie Lamport,
  \emph{\LaTeX: A Document Preparation System}.
  Addison Wesley, Massachusetts,
  2nd Edition,
  1994.

\end{thebibliography}
```

References

[1] Leslie Lamport, *LaTeX: A Document Preparation System*. Addison Wesley, Massachusetts, 2nd Edition, 1994.