LaTeX workshop: handbook

Vivienne Rogers
University of Oxford
vivienne.rogers@education.ox.ac.uk

Wednesday 3 February 2010

Contents

1 Introduction

LaTeX is a typesetting program that encourages the separation of content and layout. It allows you to have complete control over how your document will appear but when writing you focus on the content and structure. LaTeX refers to the language (or commands) the document is written in and is not a document in itself. You need a *text editor* to create a *.tex* file. You can then *typeset*(the term used with a mac) or *build* (the term used for a PC) your document. There are a variety of different text editors freely available. For the PC, I will use Texnic Center, which is installed on all the computers in seminar room J. For the Mac, I use TeXshop, which comes with LaTeX when you download it.

1.1 Installing LaTeX on your computer

1.1.1 PC/Linux instructions

The version of LaTeX for Windows or Linux is called MikTeX. You can download miktex from www.miktex.org. Click on Miktex 2.8 under "Download" on the menu on the left hand side. Scroll down and you will see a choice between "basic miktex" and the "complete installer". Just choose the basic one. A file will download - just double click on it and follow the instructions. When asked, you should choose the setting "yes" for "Install packages on the fly".

The editor program I suggest you use is called TeXnic Center. You can download this from www.texniccenter.org. Again click on downloads and if you scroll down the page then it's option 1 (texniccenter installer) and the follow the instructions.

If you decide to use LaTeX then you may wish to install a bibliography manager. There are several but a commonly used one for the PC/Linux is JabRef. This can be downloaded from jabref.sourcefourge.net.

1.1.2 Mac instructions

Installation on the Mac is simpler as the text editor (TeXshop) comes with the LaTeX download. You can download the MacTex package from www.tug.org/mactex/. Once the download is finished load the disk image (if it doesn't happen automatically) and run the installer (MacTeX-2009.mpkg) contained within.

You may also want to download a program called BibDesk to manage your bibliography. It is available from bibdesk.sourceforge.net

1.2 File management

When you use LaTeX then it creates a lot of little files - the .tex file in which you do your typing, the .pdf file that you output but also a number of logs and aux files. Therefore, it is a good idea to create a separate folder for each article or book you write. However, if you include pictures or a bibliography then those files should also be in the same folder. You can tell the program where to look for the pictures or bibliography if you have them saved elsewhere but this is more complicated at this stage.

1.3 Special Characters

In LaTeX certain characters do certain things. Some important ones are:

- \this is used to introduce a command or instruction
- & this is used to separate entries in a table
- { } - curly brackets are used to enclose commands or headings
- $ - this introduces the maths environment and is useful for certain operators or symbols
- % is used to introduce a comment that won't appear in the final output. It can be useful for notes.
- accents use the \followed by either

  ^ ‘ ’ " ~

- No matter how many spaces you use, it is still treated as one space.
- An empty line starts a new paragraph.

If you need to use any of these in the document then simply put a backslash \before the symbol, e.g. \$ to produce $. LaTeX allows you to use a vast range of over 5000 different symbols - including accents, phonetic symbols, maths etc. For a comprehensive guide, please see http://www.ctan.org/tex-archive/info/symbols/comprehensive/symbols-a4.pdf

2 Document structure

LaTeX documents can be divided into three sections:

- the *preamble.*This is is where you put information about your document, e.g. type of document, font, packages.

- the content - this is the content that you write. Before you start writing content you must begin and end with

  ```
  \begin{document}
  ...
  \end{document}
  ```

- any end matter, e.g. bibliography and appendices. This information comes immediately before the final \end{document}

2.1 Preamble

In the preamble you specify what document class you are using as well as any packages (more about that later) you will use. There are several different document classes. These are *book*, *report*, *article*, & *letter*. We will not deal with *letter* here. There are also several options within the document class for fonts or page style etc. An example for the text "Hello World" is given below.

```
\documentclass[11pt, twoside, a4paper]{article}
\begin{document}
Hello World
\end{document}
```

2.2 Structuring the content

The choice of document class has implications for the chapter and sectioning commands. LaTeX allows up to 7 levels of sectioning but it's unlikely you will ever use all of them. The titles of each chapter/section is given enclosed in curly brackets after the command. For example:

```
\chapter{Methodology}
\section{Tasks}
\subsection{Comprehension Task}
\subsubsection{Phase A}
```

The chapter command is only possible in reports or books, i.e. not articles.

So if we want to make a book with several chapters and sections it would look like this:

```
\documentclass[11pt, twoside, a4paper]{article}

\begin{document}
\chapter{Hello World}
\section{All about me}
\subsection{My hobbies}
```

```
\chapter{Hello Universe}
\section{Is anybody out there}
\section{How to contact me}

\end{document}
```

2.3 Large documents

It is possible to use one long .tex file with all the different chapters marked as \chapter. However, if you are writing a thesis or book then it is often a good idea to split the document into different parts. This means that when one part is finished you don't need to continue to build it when you are working on another chapter. To do this you want to create a "skeleton" or "master" file and *include* the other chapters.

2.3.1 Making a master or skeleton file

When you make the master file, all the preamble, appendix and bibliography information goes in the master file and does not need to be repeated in each of the chapter files. The chapter files then start with \chapter.

You can also have the title page (\maketitle), table of contents (\tableofcontents), abstract (\begin{abstract} ... \end{abstract}) and so on in the in the skeleton file. To make the title page, you need to provide *author* and title *title* information. For example

```
\documentclass[11pt, twoside, a4paper]{book}
\author{Vivienne Rogers}
\title{Hello World}
\date{Feb 2010}

\begin{document}
\maketitle
\begin{abstract}
This is an abstract about the book Hello World.
\end{abstract}

\tableofcontents
\include{Introduction}
\include{World}
\include{Universe}

\end{document}
```

3 Exercises: Section A

Before you begin: In the My Documents folder you will find a folder called "LaTeX workshop". Save this folder to somewhere appropriate. Open Texniccenter (either using the desktop shortcut or by going to All Programs).

3.1 Exercise 1

- Open the file hello.tex.
- You will see that it just contains some text but no commands.
- You need to turn this into a LaTeX file:
  - Specify that you are writing an article on a4 paper in 12pt.
  - Insert the begin and end document commands.
- Build this file by going to Build> Current File> Build and View (or shift ctrl F5).

3.2 Exercise 2

Using the hello.tex file that you have just changed, we need to add in some structure.

- Add in three section headings: Introduction, Background and Methodology. These are currently indicated by capital letters.
- In the methodology section, add two subsections: Task and Participants. These are currently indicated by capital letters.
- Build this file by going to Build> Current File> Build and View (or shift ctrl F5).

3.3 Exercise 3

We would now like to add in a title page and table of contents.

- Add in some author (your name), title (Hello World) and date (Feb 2010) information to the *preamble*.
- Add a titlepage using the "maketitle" command.
- Add a table of contents using the "tableofcontents" command.
- Build and view your file.

3.4 Exercise 4

We are now going to create a master file including two chapters (world, universe). The chapters have already been created for you but please look at the files to make sure you understand them.

- Open a new file (File>New) and save it as master.tex.
- Create the preamble for a book, 11pt, a4paper. You are the author and the title is (Me, the world and the universe). Give the date Feb 2012.
- Make sure the book will have a title page and table of contents.
- Make sure to begin and end the document.
- include the chapters 'world' and 'universe'.
- Build and view your file.

4 Tables, lists, glosses & pictures

4.1 Tables

4.1.1 Tables: Tabular environment

- To create a table you use the tabular environment: you need to specific \begin and \end.
- The basic command looks like this

```
\begin{tabular}{table specification} ... \end{tabular}
```

- Table specification: you can specify if the column is centred, left or right justified, if you want single, double or no lines between columns.
- Use \hline to insert a horizontal line.
- Use & to separate cells in rows and \\ at the end of each line.

For example: To have a three column table with the columns left, centred then right justified, with the first two columns separated by a line.

```
\begin{tabular}{l | c r}
Name & Age & Gender\\ \hline
Joe & 12 & male\\
\end{tabular}
```

Name	Age	Gender
Joe	12	male

4.1.2 Tables: the Table environment

- The *table* environment surrounds the *tabular* environment.
- It allows you to insert details about where on the page the table should be, captions, labels etc.
- Position options are *h* (here), *t* (top of page), *b* (bottom) and *p* (on a dedicated page of tables). You usually include all 4 options arranged in the order of priority, e.g. here first but if not then at the top of the next page = [ht]
- Labels allow you to refer to the table (or chapter, section, example) in the text and update automatically even if you move the examples around.

- If you want to refer to a label in the text you type \ref{your label}, e.g. \ref{table:partns}

For example:

```
\begin{table}[htbp]
\begin{tabular}{l c c}
ID & gender & age\\\hline
NS01 & male & 23\\
NS02 & female & 24\\
NS03 & male & 21\\
\end{tabular}
\centering
\caption{Participants: Native Speaker controls}
\label{table:partns}
\end{table}
```

ID	gender	age
NS01	male	23
NS02	female	24
NS03	male	21

Table 1: Participants: Native Speaker controls

4.2 Lists

There are three types of lists that you can use and customise in LaTeX. These are called description, itemize and enumerate (numbered). Each begins with \begin and ends with \end and each item on the list is introduced by \item.

4.2.1 Lists: description

If you would like to use a description list then the command structure is given below:

```
\begin{description}
\item[The first item]
\item[The second item]
\end{description}
```

This gives the following type of list (i.e no numbers or bullets):

The first item

The second item

4.2.2 Lists: itemize

If you would prefer your list to have bullet points then you want to use an *itemize* list. Please note the spelling. An example of the commands is given below:

```
\begin{itemize}
\item The first item
\item The second item
\end{itemize}
```

This gives the following type of list (i.e with bullets):

- The first item
- The second item

4.2.3 Lists: enumerate

To use the numbered lists (enumerate), you need to specify \usepackage{enumerate} in the preamble, i.e. before \begin{document}. You can customise this list to have letters or roman numerals. The default is 'ordinary' numbers.

```
\begin{enumerate}
\item The first item
\item The second item
\end{enumerate}
```

This gives the following type of list (i.e with numbers):

1. The first item
2. The second item

4.3 Numbered examples and glosses

One limitation of *enumerate* is that it won't do a continuous list, i.e. you want the example numbering to continue even when there is text in between. The solution is to use the *covington* style package. If you use a mac you need to download this from CTAN www.ctan.org. If you have a PC/Linux then you can install this by using the Package Manager (Start>All Programs>Miktex>Maintenance>Package Manager and search for covington). You then need to insert the following command in the *preamble*

```
\usepackage{covington}
```

To use covington for your lists, you use the following commands.

```
\begin{examples}
\item This is example one.
\item This is example two.
\end{examples}
```

(1) This is example one.

(2) This is example two.

Covington not only allows you to do continuous numbering of examples (as shown by the examples below) but it also allows you to gloss a sentence:

(3) John often kisses Marie.

(4) *Jean embrasse souvent Marie.*
Jean kisses often Marie.
'*John kisses often Marie'

Example 4 was glossed by introducing the \gll command for the line that is to be glossed (GLoss Line) and the \glt command for the translation (GLoss Translation). You also need to say that the gloss is finished for that item by using \glend.

```
\begin{examples}
\item \gll Jean embrasse souvent Marie.
Jean kisses often Marie.
\glt '*John kisses often Marie'
\glend
\end{examples}
```

4.4 Inserting pictures

To insert a picture, diagram or another file (e.g. a pdf output from SPSS) then you need to do two things.

1. Put the command \usepackage{graphicx} in the *preamble*.
2. Use the command \includegraphics[width=.5\textwidth]{image.pdf}.
3. You can insert a variety of file types including pdf or png.

You can also use the *figure* environment in the same way as the *table* environment to add captions, labels, etc. You can specify the width in actual size (e.g. inches, cm) or as a percentage of the textwidth (as shown above).

Example of structure for inserting a diagram called xbartree2.pdf.

```
\begin{figure}[htbp]
  \centering
    \includegraphics[width=.5\textwidth]{xbartree2.pdf}
    \caption{Basic underlying sentence structure}
    \label{fig:basic_tree}
\end{figure}
```

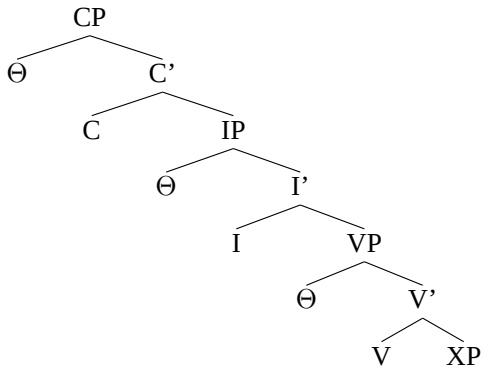

Figure 1: Basic underlying sentence structure

5 Citation and bibliography management

5.1 Managing a bibliography: Bibtex

LaTeX uses a sister program called *Bibtex* to order references. The easiest way to use bibdesk is with a software interface.For the Mac the best is called *Bibdesk* and for the PC *Jabref*.These are both freely available to download from sourceforge.net. You can export your Endnote or Refworks file to use with bibtex. Each reference is given a *citekey*, e.g. chom86. Either you can make it up or get it generated automatically. This is what you use when you cite in your document. You can also attach the pdf files of the article, copy in the abstract and write your notes in either Bibdesk or JabRef.

5.2 Citations

To use bibtex with LaTeX you need to specify certain things in the *preamble* and also the *end of the document*. In the preamble, add the package *natbib*. This allows you to sort your citations (particularly useful when you have multiple citations of authors or years) and also allows you to specify which type of citation style you want. The bibpunct option allows you to define the punctuation you want your citations to have, e.g. : or ; before the page numbers. If you cite something in the text, then it is automatically generated in the bibliography. You will need to "build" your document

twice in order for it to work out all the citations. On the Mac, you need to go to Macros>Applescript>Bibliography in order to get your citations and bibliography typeset.

An example of what you need in the preamble is given below:

```
\usepackage[sort]{natbib}
\bibpunct[: ]{(}{)}{,}{a}{,}{,}
```

At the end of the document, you need to specify the style of bibliography (e.g. apa, harvard, plain) and say where you want your bibliography to be. Usually this is the last thing before appendices and \end{document}.

```
\bibliographystyle{apa}
\bibliography{filename}

\end{document}
```

5.3 Citation commands

The following options are for the citation for Chomsky 1986. For full details see the Natbib manual.

```
\citet{chom86} = Chomsky (1986)
\citep(chom86} = (Chomsky 1986)
\citet[22]{chom86} = Chomsky (1986:22)
\citep[see][22]{chom86} = (see Chomsky 1986:22)
\citet{chom86, chom05} = Chomsky (1986, 2005)
\citep[see, for example,][]{chom86, aug03}
= (see, for example, Auger 2003, Chomsky 1986)
```

6 Further help

This has been a brief introduction but there are a lot of helpful places to go to look for help and advice.

LaTeX wikibook: http://en.wikibooks.org/wiki/latex

Leeds online help: http://www.andy-roberts.net/misc/latex/index.html

Natbib: http://www.ctex.org/documents/packages/bibref/natbib.pdf

Linguists: http://www.essex.ac.uk/linguistics/external/clmt/latex4ling/

Oxford Maths: http://www.maths.ox.ac.uk/help/faqs/latex

7 Exercises: Section B

7.1 Exercise 5: Tables

Using the same files as before, add the following table into the Methodology section of World.tex

Group	beginner	low-int	high-Int	NS
beginner	-	.00*	.00*	.00*
low-int	.00*	-	.021*	.044*
high-Int	.00*	.021*	-	1.0
NS	.00*	.044*	1.0	-

Table 2: Significant differences in comprehension results for negative items

Feel free to add/change the lines between columns and rows. Build your file.

7.2 Exercise 6: Lists

Add the following list (what type is it?) to the Introduction section of World.tex

- The first item
- The second item
- The third item

Build and view your file.

7.3 Exercise 7: Adding diagrams

Add the picture golf.png to the universe.tex file. Give the picture a caption using *figure* as shown below.

Figure 2: Woman playing golf

7.4 Exercise 8: Adding citations

- In the folder you opened at the beginning of the class there is a file called example.bib. This is an example bibliography.
- Add the natbib, bibpunct, bibliographystyleplain and bibliographyexample commands to your master file.
- Add in citations to chom86, bell90 and pre00 to the universe.tex file where you see the capital letters saying CITE. These citations should be of the form Chomsky (1986).
- Add a page reference to pre00. Page 101.
- In the world.tex file add in citations for myl05 and dav09. These should be of the form (Myles 2005).
- Build and view your file.