What is LaTeX?
Downloading LaTeX and editors
LaTeX documents
Some basic LaTeX features

Biostatistics workshop series:
Introduction to LaTeX

Dr Cameron Hurst

cphurst@gmail.com

CEU, ACRO and DAMASAC, Khon Kaen University

6th June 2556

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

What we will cover....

1. What is LATEX?

2. Downloading LATEX and editors
   - Download LATEX
   - LATEX working environments
   - TeXmaker

3. LATEX documents
   - Our first LATEX document
   - Other types of LATEX documents

4. Some basic LATEX features
   - Bibliographies and referencing
   - Other software and features

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Conventions

The conventions I will use:

Notes and Hints:.....

Things to note will occur in a green box

Pitfalls:.....

Common mistakes and things to watch out for will occur in a red box

What is LaTeX?
Downloading LaTeX and editors
LaTeX documents
Some basic LaTeX features

MS-Word vs LaTeX

- Most of us are used to WYSIWYG (What you see is what you get) editors such as the MS-Word wordprocessing software
- In contrast, TeX and it's easier cousin, LaTeX, are low level, mark-up programming langauages used to create documents (similar to html used to code webpages)
- When you first start using LaTeX you will wonder why you don't just stick with MS-Word.

QUESTION: Why would you put yourself through this pain??

ANSWER: Because LaTeX documents are ♡♡**BEAUTIFUL**♡♡ !!

What is LaTeX?
Downloading LaTeX and editors
LaTeX documents
Some basic LaTeX features

So what does LaTeX do for us

The usphot is that LaTeX can generate pdfs (and other formats) for:

- Articles (Manuscripts)
- Reports (longer)
- , Books and theses (longer again)
- Presentation slides (Beamer)

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Download LATEX
LATEX working environments
TeXmaker

Windows: MikTeX

There are a few different windows 'versions' of LATEX, but perhaps the most common is MikTeX.

1. Google: Download *miktex* and it should list the official MikTeX site first. (Go to this site)
2. Download the "Recommended download" of MikTeX
3. Follow the instructions

What is LaTeX?
Downloading LaTeX and editors
LaTeX documents
Some basic LaTeX features

Download LaTeX
LaTeX working environments
TeXmaker

Macs: MacTeX

If you are using a Mac, MacTeX is the best choice for you.

1. Go to the TeX users group page
   http://www.tug.org/mactex/downloading.html
2. Go to the file link on the page (MacTeX.pkg)
3. Install the package as you would any other Mac package

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Download LATEX
LATEX working environments
TeXmaker

Straight LATEX code vs LATEX editors

Now that we have LATEX on our machines, we could start creating
LATEX documents, but unless you really know what you are doing,
you will probably want to use a LATEX editor:

- LATEX editors make the creation of LATEX documents a little
  (more or less) like using a word processor (like MS-Word)
- Some editors are VERY basic (almost just like using Notepad),
  whereas some are much closer to WYSIWYG editors
- I have found the WYSIWYG editors (e.g. Lyx) use specialied
  libraries limiting the portability of your document (moving
  from computer to computer)
- I use (and suggest you use) **TeXmaker**.

There are many other sites you can download TeXmaker

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Download LATEX
LATEX working environments
TeXmaker

TeXmaker

So before we start, let's also download TeXmaker.

1. Google *Download Texmaker* or go to site:
   www.xm1math.net/texmaker/download.html.
   - If you are a Windows user, download TeXmaker for Windows
   - If you are a Mac user, download TeXmaker for Mac

2. Follow the instructions

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Our first LATEX document
Other types of LATEX documents

Before we start: Some important hints

Common LATEX problems

- ► Windows (and word) tend to use some non-true type font symbols
- ► These include: ", ', - (and other non-alphanumeric characters)
- ► When copying text from word, LATEX will often identify problems (but not be very imformative about where the problem is)

Work-around: Non-standard symbols

To isolate where these problem symbols occur ALWAYS copy (from word), **A SINGLE PARAGRAPH AT A TIME** and then run your LATEX code.

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Our first LATEX document
Other types of LATEX documents

The main LATEX document is the ".tex" file, a text file that contains all the LATEX code. Here is a very basic .tex file (WIth no text or features)

```
\documentclass[11pt, oneside, a4paper]{report}

%Preamble: Extra packages (for extra features etc.)

%Top matter: Title, author, etc

\begin{document}

%Insert document text here blah blah balh

\end{document}
```

NOTE: % tells LATEX that this is a comment. LATEX ignores these lines

What is LaTeX?
Downloading LaTeX and editors
LaTeX documents
Some basic LaTeX features

Our first LaTeX document
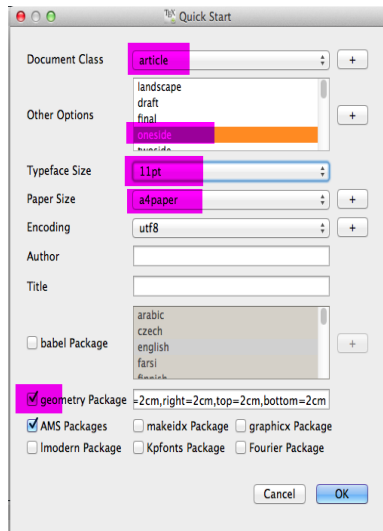Other types of LaTeX documents

Our first LaTeX document

- Let's start by 'writing a paper'', for this we will typically use the 'article' class.
- We will use a paper we (myself along with some of my colleagues) are writing in word
- We will call it: ''Child temperament and parent selection of early childhood education and care''
- We will use 11pt font, on one-sided sheets

I have provided you with a word document of our current draft of this 'work-in-progress' paper

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Our first LATEX document
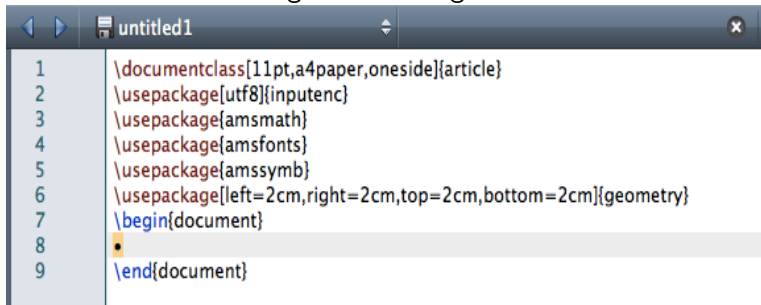Other types of LATEX documents

Our first LATEX document

1. Open TeXmaker

2. In the pull-down menu, go to Wizard → Quick start (you should get a dialogbox similar to that on the right)

3. Make sure all of the areas highlighted in pink are the same.

4. Press OK

Note: I have provided a walk-thru file demonstrating how to do this

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Our first LATEX document
Other types of LATEX documents

Our first LATEX document

You should get a tex file generated like:

Save this file as "myfirsttexdoc.tex" in a directory (create one) called myfirsttexdoc

Now we are ready to start entering text.

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Our first LATEX document
Other types of LATEX documents

Learning by doing

- Now I will leave the presentation for a little while, while we experiment with LATEX
- We will investigate the following aspects
  1. Adding text
  2. Sectioning (Sections, subsections, chapters etc)
  3. 'Running' our LATEX code to get a pdf file

Making life easier.....later

Remember to use lots of comments (lines starting with the % charatcer), so you can remember what it all means

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Our first LATEX document
Other types of LATEX documents

Other documents: Theses

- Although LATEX does not come with a native 'thesis' class, many people from many universities around the world have written thesis classes and packages.
- Just google "Latex thesis" and many will come up

Hints: Books and Theses

As theses (and books) are so large it is a good idea to create each chapter in it's own "tex" file. That way you can work on one chapter at once with out having to run the whole document at once.

What is LaTeX?
Downloading LaTeX and editors
LaTeX documents
Some basic LaTeX features

Our first LaTeX document
Other types of LaTeX documents

Other documents: Beamer presentations

- Beamer is a class of (LaTeX) documents especially for generating presentations
- In fact THIS presntation was generated using the Beamer class
- A little bit more knoweldge needed to use beamer (but nit noi)
- Again MANY online resourses and tutorials on how to use Beamer

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Bibliographies and referencing
Other software and features

Often we want to change the style or size of our text:

Style	LATEX function	Result
Emphasis	\emph{my text}	*my text*
Courier font	\texttt{my text}	my text
Bold font	\textbf{my text}	**my text**
Italics	\textit{my text}	*my text*
and many more....		

Font size	LATEX function	Result
Tiny	\tiny{my text}	my text
Scriptize	\scriptsize{my text}	my text
Small	\small{my text}	my text
Normal	\normalsize{my text}	my text
Large	\Large{my text}	my text
Huge	\Huge{my text}	my text
and many more....		

What is LaTeX?
Downloading LaTeX and editors
LaTeX documents
Some basic LaTeX features

Bibliographies and referencing
Other software and features

SECTIONING

\part{title}

  \chapter{title}   %only in books and reports

    \section{title}

      \subsection{title}

        \subsubsection{title}

          \paragraph{title}

            \subparagraph{title}

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Bibliographies and referencing
Other software and features

Tables and Figures

- At first glance figures and (especially) tables look complicated in LATEX
- My suggestion is that you use the wizard (tables) and LATEX (figures) pull down menu when you first start using figures and tables
- However (unlike word) you can do almost anything in LATEX with figures and table

Hints: Figures, tables and other features for beginners

- ▶ Use pull down menus to create the code for figures and tables while you are learning the syntax
- ▶ Always remember when you use a new feature in a LATEX document. You will probably come back to copy and paste it
- ▶ Don't forget to comment you code

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Bibliographies and referencing
Other software and features

Bibliographic management: BibTeX

- LATEX has it's own way of managing references using an external database (".bib" file)
- Almost all referncing mangement software (e.g. Endnote) and literature seach engines (e.g. Scopis) will output into the BibTeX format
- Also many reference mangement packages (e.g. BibDesk) that will help you store and manage your BibTex files (Free and good alternative to Endnote)

What is LᴬTᴇX?
Downloading LᴬTᴇX and editors
LᴬTᴇX documents
Some basic LᴬTᴇX features

Bibliographies and referencing
Other software and features

Integrating LᴬTᴇX with other software: R

- Like LᴬTᴇX, R is a open source software package (Free)
- R is a package where thousands of statisticians and researchers have uploaded their code (as R libraries) for the use of others
- Unlike SPSS and Stata, R is purely syntax driven (not so many pull-down menus)
- BUT it is by far the most powerful and verstatile statistics pacakge around
- VERY SOON you will be R experts (about 6 months)......I will make sure you are
- R integrates VERY well with LᴬTᴇX (there are a few ways). **BUT UPSHOT IS: you can run your R code and your output will AUTOMATICALLY update in you LᴬTᴇX document**

WATCH THIS SPACE

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Bibliographies and referencing
Other software and features

Resources

I have just scratched the surface of LATEX in this session, but (as well established, open source software), there are many resources on the web for learning to use LATEX. These include:

- Presentations like this one
- Wikibooks and free manuals and textbooks
    - Wikibooks: en.wikibooks.org/wiki/LaTeX
    - LATEX-Bog, Lars Madsen:
      www.imf.au.dk/system/latex/bog
- Official page: www.latex-project.org
- Cheat sheets: www.stout.org/~winston/latex
- User support groups (I have never come across a problem not seen and solved by someone else): (TUG: TEXusers group; Stack-overflow etc)

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Bibliographies and referencing
Other software and features

Concluding remarks: Best practice

Do s:

- ▶ Learning LATEX takes time. If you are writing a manuscript or thesis, decide to use LATEX instead of MS-word
- ▶ Once you are used to LATEX you will seee word documents in another light (a poor substitute)
- ▶ Best way to learn LATEX is by DOING
- ▶ **DOCUMENT, DOCUMENT, DOCUMENT**: Always "comment" your code (Use plenty of %s). Especially when doing something non-standard (or learning something for the first time
- ▶ Start with simple documents (e.g. writing your abstract) and then work up to the more advanced use of LATEX (e.g. Beamer presentations)

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Bibliographies and referencing
Other software and features

Concluding remarks: Things to avoid

Don'ts:

- ► Don't reinvent the wheel: If you come across a person, search the user group responses and use online texts (you can bet someone has had the problem before)

- ► For books and theses, don't just write it in the one file. The main LATEX document can be made up of seperate 'sub'-documents. (e.g. Thesis.tex can "include" Chap1.tex, Chap2.tex etc)

- ► Don't forget the open-source philosophy: Just like the scientific community knowledge should be free (it leads to much higher innovation). When you feel strong enough in LATEX, teach other people how to use it.

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Bibliographies and referencing
Other software and features

THANK-YOU!!

Questions??

YOUR TURN

What is LATEX?
Downloading LATEX and editors
LATEX documents
Some basic LATEX features

Bibliographies and referencing
Other software and features

Exercize: Writing a 'shell' for our manuscript

- As I mentioned before, the best way of learning LATEX is "doing".
- Now we will write a shell for our manuscript (together).
- We will write it together (with a title I will make up), but you can replace this later with your own topic

LET'S START