What is TeX?

- TeX written in plain as TeX is a typesetting system created by Donald Knuth.

1. Allows anyone to write high quality books
2. Provide exact same results on all computers past and present
3. Very customizable
4. Many flavors including
   - Slitex
   - Miktek
   - TexPoint
   - Latex (Lamport)
TeX (Dis)/Advantages

- Much different than WYSIWYG approach of MS Word, Corel Word Perfect
- Documents look much more professional, that is, they look “printed”
- Typesetting of mathematical formulas is very convenient.
- To begin, one need know only a few basic commands to structure the document.
- Footnotes, references, bibliography, section headings, table of contents, are all easily handeled.
- Many add-on packages available.
- TeX is FREE.

! can be automatic
How does it work?

System can be broken into 4 levels.

1. Characters are read from an input file (.tex file).
2. Code is compiled, errors are returned
3. .dvi (DeVice Independent) is created
4. .dvi is converted into .ps (postscript) or .pdf (portable device format) file

Specifically, we will focus on LaTeX
Two options for Tex

1. For your own machine
   
   (a) Computer with software installation privileges
   (b) Install the Miktex package on your computer following standard installation wizard. Miktex is at http://miktex.org
   (c) Install Ghostview on your computer in the same way.
   (d) See the webpages....

2. A connection to UBUnix
Other options for TeX

• Windows users can consider TeX Live or Texworks
• Mac users should consider MacTex package

Online Tex -
https://www.overleaf.com/
MikTeX “Hello World”

1. Create a .tex file (Text editor, e.g. Emacs, Xemacs, Wordpad).
   
   (a) From Wordpad create your .tex file (or .txt file).

2. Compile it (MikTex package).
   
   (a) Open a “command prompt” from the start tab  
   (b) “cd” (change directory) to the correct directory  
   (c) Type “tex myfile.tex” or “latex myfile.tex” to compile and create a .dvi file

3. Fix the compiling errors.

   
   (a) Type “dvips myfile.dvi” (this creates the postscript file)  
   (b) Type “ps2pdf myfile.ps” (this creates the pdf file from the ps file)
A typical LaTeX session

\documentclass{article}
\begin{document}
Short and sweet
\end{document}

A few more useful options

\documentclass[11pt, twoside, a4paper]{article}
\begin{document}
Short and sweet
\end{document}
Some Hints

• The following have a special meaning in LaTeX:

    #  $  %  ^  &  _  {  }  \sim

• If you want to use the above without their special meaning put a \ in front of the character, e.g. type

    \$ to get $  

• % character acts as comment environment.
Some More Hints

When Latex (or Miktex) processes an input file, it expects a certain structure. Thus every input file must start with the command

```
\documentclass{...}
```

Generally the following is very flexible

```
\documentclass[12pt]{article}
```

Once all the setup work is done, you start the body with

```
\begin{document}
```

and end the body with

```
\end{document}
```
\documentclass{article}\pagestyle{empty}
\begin{document}
\noindent Well, sort of, (under weak assumptions) \\ \\
\begin{center}
$h^\{\ast\} = \frac{c_1^{-2/5}c_2^{1/5}c_3^{-1/5}}{n^{-1/5}}$
\end{center}
\noindent Where $c_1 = \int x^2K(x)dx$, $c_2 = \int K(x)^2 dx$, $c_3 = \int (f^{\prime\prime\prime}(x))^2dx$
\\
\noindent Great! but what’s $f$?
\end{document}
Examples

Well, sort of, (under weak assumptions)

$$h^* = \frac{c_1^{-2/5} c_2^{1/5} c_3^{-1/5}}{n^{-1/5}}$$

Where $c_1 = \int x^2 K(x)dx$, $c_2 = \int K(x)^2 dx$, $c_3 = \int (f''(x))^2 dx$

Great! but what’s $f$?