LaTeX Tutorial

Lingchao Meng

School of Economics
Peking University

April 22, 2020

This is just a beginners guide to writing documents in LaTeX without prior knowledge of LaTeX. This slide is designed for the LaTeX workshop at School of Economics, Peking University.

This file and some other materials can be download from my GitHub repository: https://github.com/MengLingchao/LaTex_tutorial. Please feel free to download and use it.

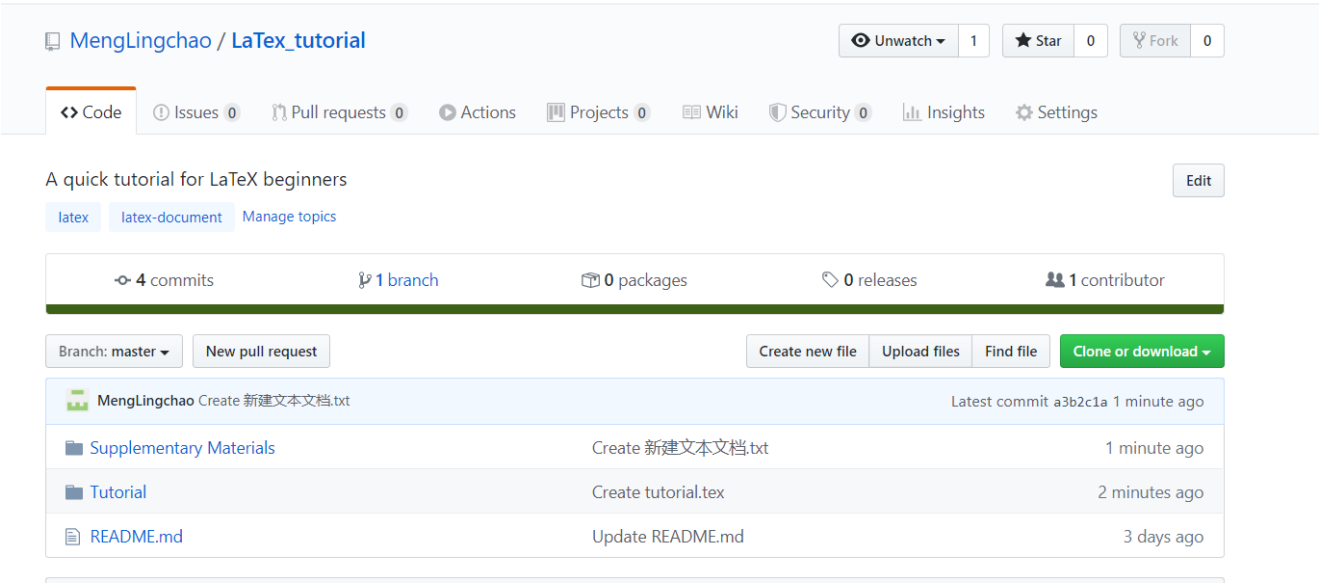


Figure: GitHub Repository

Outline

Section 1

Introduction

What's LaTeX?

LaTeX (pronounced either "Lay-tech" or "Lah-tech")

- is based on Tex, a typesetting system designed by Donald Knuth in 1978 for high quality digital typesetting.
- is a *typesetting system* and *programming language*, not a *word processor*.

This is **my** *first* document prepared in LaTeX. I typed it on April 22, 2020.

```
This is \textbf{my} \emph{first}
    document prepared in \LaTeX. I
    \underline{typed} it on \today.
```

Listing 1: the typesetting nature of LaTeX

Why LaTeX?

- Donald Knuth says that his aim in creating TEX is to beautifully typeset *technical documents* especially those *containing a lot of Mathematics*.
- Most English journals have their own LaTeX template.
- Even for ordinary text, LaTeX is also a good choice.

Installation

On Windows, users have two main choices of TeX system to install: TeX Live or MiKTeX. I highly recommend Tex Live for the following reasons

- The standard installer for MiKTeX installs 'just the basics' and uses on-the-fly installation for anything else you need; the standard install for TeX Live is 'everything' (about 4.5 Gb!).
- Real-time updates.
- Faster compilation (especially in case of graphics files)

Installation

There are many different editors of LaTeX.

- professional LaTeX editors, such as TeXstudio, TeXwork.
- edit LaTeXfiles using Vim, Sublime Text, Visual Code, etc.

Recommend Tex Live with TexStudio, you can refer to https://blog.csdn.net/zywhehe/article/details/83113214.

Installation

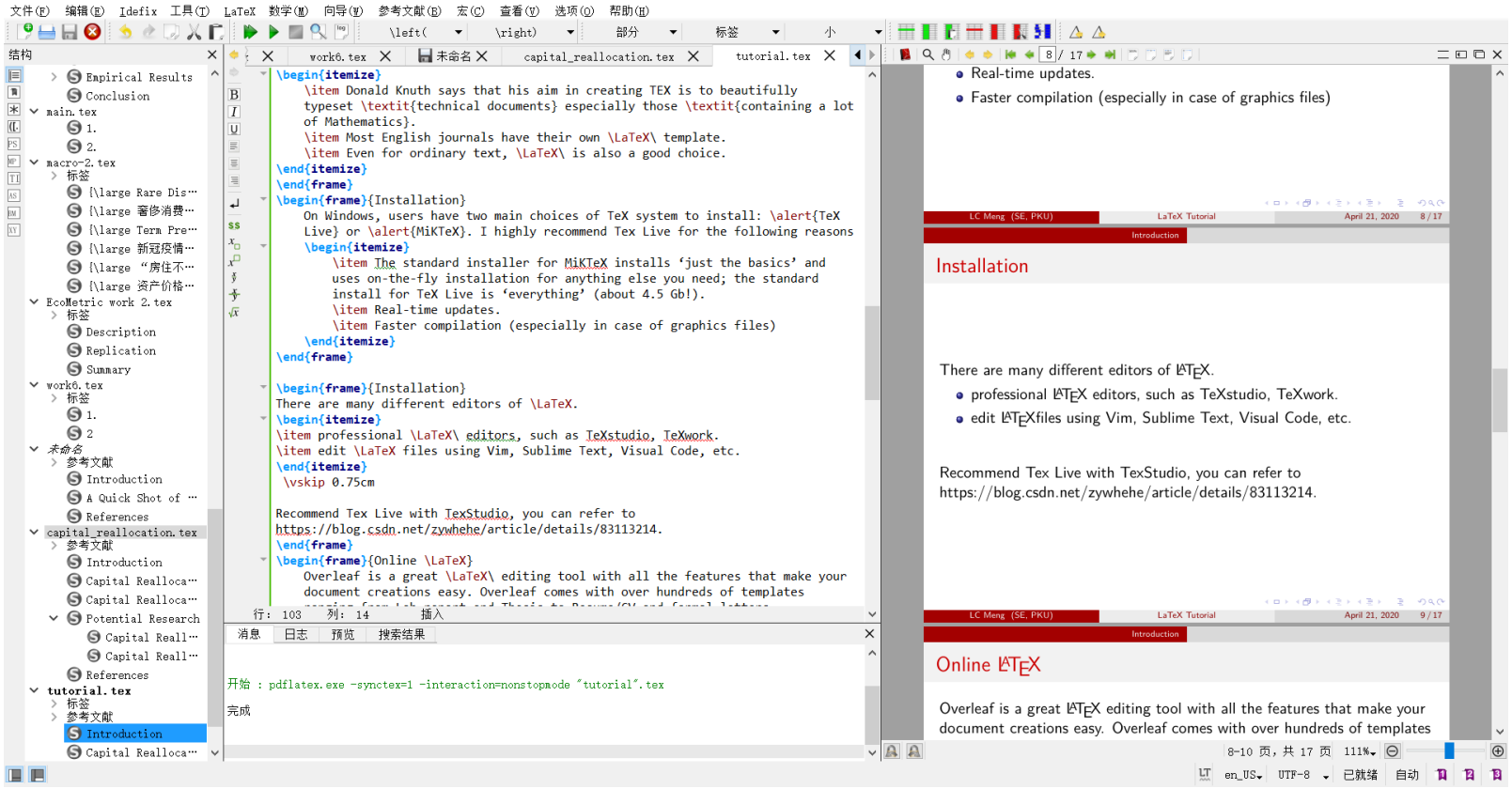


Figure: TeXstudio

Online LaTeX

Overleaf(https://www.overleaf.com/) is a great LaTeX editing tool with all the features that make your document creations easy. Overleaf comes with over hundreds of templates ranging from Lab report and Thesis to Resume/CV and formal letters.

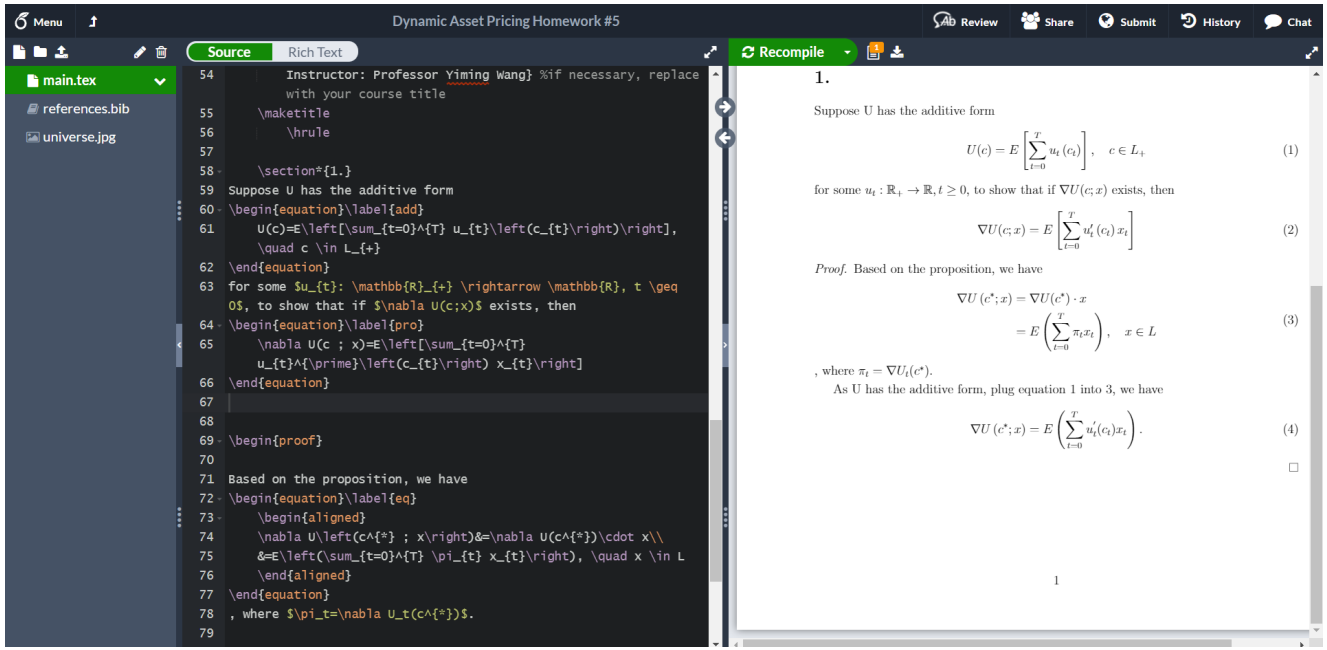


Figure: Overleaf website

Section 2

LaTeX Basic

The basic structure of a LaTeX file

1. The *documentclass* command: define the property of the file
   - article, beamer, report, thesis, letter, book
2. Preamble: including the packages, format the article.
3. Begin and end of the document: the main body of the file.

```
\documentclass[options]{article}
Preamble (for LATEX commands only)
\begin{document}
Document text (text with embedded LATEX commands)
\end{document}
```

Document Structure

LaTeX can organize, number, and index chapters and sections of document. There are up to 7 levels of depth for defining sections depending on the document class

- `\part{title}`
- `\chapter{title}`
- `\section{title}`
- `\subsection{title}`
- `\subsubsection{title}`
- `\paragraph{title}`
- `\subparagraph{title}`

LaTeX vocabulary

- **Commands**: produce text or space, like `\textit{it}`.
- **Declarations**: affect the following text, like `\Large` or `{\Large }`.
- **Environments**:receive special processing and are defined by `\begin{name} ... \end{name}`.
- **Mandatory arguments**: are included in braces, like `\hspace{2in}`.
- **Optional arguments**: are enclosed in brackets [ ], like `\documentclass[11pt]{article}`.
- *: indicates a variation on a command or environment.

A little sample

See the simple sample!

Section 3

Basic Typesetting

Basic Typesetting

- Simply enter your content in most times, just like using word or txt.
- When you need to start a new paragraph, add `\par` in the end or empty one line between two paragraphs.

The first paragraph.
The second paragraph.
The third paragraph.

```
1 The first paragraph.\par
2 The second paragraph.
3
4 The third paragraph.
```

Listing 2: new paragraph

Font effects

There are LaTeX commands for a variety of font effects:

hello world
hello wolld
hello world
HELLO WORLD
hello world

```
\textbf{hello world}

\textit{hello wolld}

\underline{hello world}

\textsc{hello world}

\textrm{hello world}
```

Listing 3: Font effects

Colored text

- Include the xcolor package in the preamble by `\usepackage{xcolor}`.
- Also can define customized color, such as `\definecolor{myred}{RGB}{231, 76, 60}`.

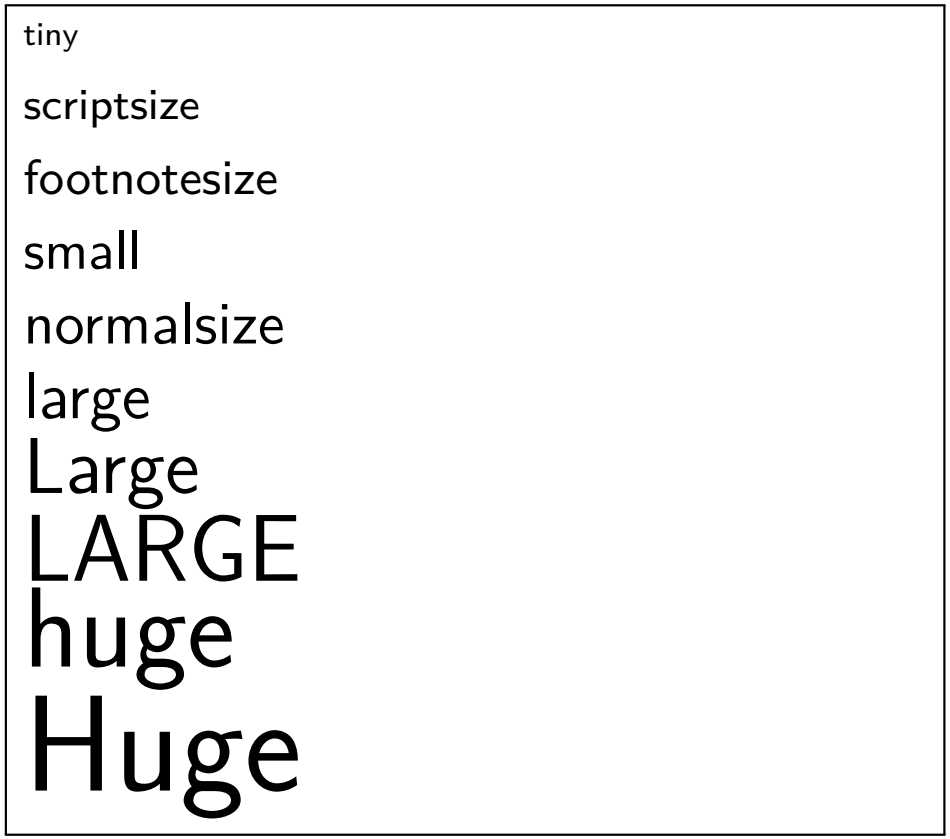
- Red
- Gray
- Myred

```
1  \begin{itemize}
2    \item \textcolor{red}{Red}
3    \item \textcolor{gray}{Gray}
4    \item \textcolor{myred}{
         Myred}
5  \end{itemize}
```

Listing 4: Colored text

Font size

- The global font size can be set by the documentclass option.
- The local font size can be changed by the following commands.




```
1 {\tiny  tiny}\\
2 {\ scriptsize   scriptsize }\\
3 {\ footnotesize  footnotesize }\\
4 {\small  small}\\
5 {\normalsize  normalsize}\\
6 {\large  large}\\
7 {\Large Large}\\
8 {\LARGE LARGE}\\
9 {\huge huge}\\
10 {\Huge Huge}
```

Listing 5: Font size

Lists

- LaTeX supports two types of lists: *enumerate* produces numbered lists, while *itemize* is for bulleted lists. Each list item is defined by `\item`. Lists can be nested to produce sub-lists.

1. First thing
2. Second thing
    - A sub-thing
    - Another sub-thing

(3) Third thing

```
\begin{enumerate}
  \item First thing
  \item Second thing
  \begin{itemize}
    \item A sub-thing
    \item[-] Another sub-thing
  \end{itemize}
  \item[(3)] Third thing
\end{enumerate}
```

Listing 6: Lists

Comments and Spacing

- LaTeX Comments are created using %. When LaTeX encounters a % character while processing a .tex file, it ignores the rest of the line.
- Multiple consecutive spaces inLaTeX are treated as a single space. Several empty lines are treated as one empty line.
- Use \␣ to produce more space and `\vspace{length}` to produce vertical space.

The following is comments 2.
more space in line like ahh.
more vertical space like following.

third paragraph.

```
1 %comments 1
2 The following is comments 2. %
      comments 2
3
4 more space in line like \ \ \ ahh.
5
6
7 more vertical space like following.
8
9 \vspace{0.5in}
10
11 third paragraph.
```

Special characters

$ % ^ & _ { } ~ \

```
1 \# \$ \% \^{} \& \_ \{ \} \~{} \
      textbackslash
```

Listing 8: Special characters

Section 4

Capital Reallocation: the Theory

Section 5

Potential Research

Capital Reallocation in China Market

Capital Reallocation and Empirical Asset Pricing

Section 6

References