LaTeX basics

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Contents

1 Introduction **2**

2 Start **2**
2.1 Sections . . . 2
2.1.1 Sub Sections . . . 2

3 Packages **2**
3.1 Useful Methods . . . 2

4 Basic Formatting **3**

5 List Structures **3**

6 Table & Floats **4**

7 Graphics **4**
7.1 Graphic Float Figure . . . 4

8 BibTeX References and Citations **4**

9 Mathematical Symbols and Equations **5**

10 Algorithms and Pseudocode **5**

11 Sty Files **5**

12 Advance Feature for Tables and Graphics **6**

13 Separating Our Work in Multiple Files **6**
13.1 this is an imported subsection . . . 6

14 Manipulating and Redefining Commands **7**

15 More Resources **7**

1 Introduction

LaTeXis a software system for document preparation. When writing, the writer uses plain text as opposed to the formatted text found in "What You See Is What You Get" word processors like Microsoft Word, LibreOffice Writer and Apple Pages. The writer uses markup tagging conventions to define the general structure of a document (such as article, book, and letter), to stylise text throughout a document (such as bold and italics), and to add citations and cross-references. A TeX distribution such as TeX Live or MiKTeX is used to produce an output file (such as PDF or DVI) suitable for printing or digital distribution.

It's widely used in academia for the communication and publication of scientific documents in many fields, including mathematics, computer science, engineering, physics, chemistry, economics, linguistics, quantitative psychology, philosophy, and political science. It also has a prominent role in the preparation and publication of books and articles that contain complex multilingual materials, such as Sanskrit and Greek. LaTeXuses the TeX typesetting program for formatting its output, and is itself written in the TeX macro language.

2 Start

It's good to use a template if your not completely understand LaTeX but if you do you can upgrade it. You can see the source file to understand what we are talking about during this document. The important tags are commented so you can understand which tag must be in LaTeX source file. **ALways remember to see the source file cause there is some symboles that we covered by commenting so we wont talk about them here.** use **two back slashes** to specify a new line explicitly.

One of the best places to start is overleaf online LaTeX editor.
Access by this link `https://www.overleaf.com/`

2.1 Sections

Use section tag to create a section. Also note that indenting in the source file don't matter and use percentage symbole to comment in the source file. Also remember that a tag in LaTeX always start by a Back Slash.

2.1.1 Sub Sections

Also sub sections come with the subsection tag and for further sub sections just add another sub in subsection tag.

3 Packages

I know that it's to soon to talk about it but because we already used it so I thought it's better to dive a little into it but remember we can't cover all the packages so you can google it or ... to find out about different packages. Packages are like programming language library that gives us some useful tools.
We use the usepackage tag to use a package. There are different packages and also packages can come with an input command [ ] right after the usepackage tag.
One of the packages we use wildly called geometry that allows us formatting the document. We used it to change the margin of our document.

3.1 Useful Methods

use geometrylandscape tag will set the doc to be in landscape mode.
use graphicx package to handle graphical data.
use the amssymb package for math symbols.
use the epstopdf package to convert eps graphics to pdf graphics.
you can search fo more packages online.

4 Basic Formatting

1. Emphasis on something

   We can bold a tex with textbf tag **like this** remember bolding will only happen in curly braces.

2. Italic Tag

   We can italic a part of text *like this*

3. Underline

   We can underline a text like this

NOTE:
formatting only applies to the text in curly braces.

4. Paragraph Formatting

   If you saw the source file you will notice the noindent tag which makes the new paragraphs not to be indented.

5. Oddities

   quoting there are two options first like normal keyboard key 'like' , "this" but something is odd for properly declare them use the quoting key in left of your keyboard ‘like’ , “this”.

6. Font

   see this link for more informations `https://www.overleaf.com/learn/latex/Font_typefaces`.

5 List Structures

NOTE:
Pay attention to the source file. Also list are like an environment so the must begin and end with begin and end tag.

1. Numbered List

   We already see one type of list called enumerated list in section 4. We used item tag to add items to our list.

2. Bulleted List

   - like this.

     you can write anything here.

3. Description List

   LaTeX software system for document preparation.

4. Nested Environment

   in this section we already showed you how to create a nested environment.

6 Table & Floats

- Tabular Environment

  Use begin and end tag with tabular to create a tabular environment. use another to specify number of columns and their align type and vertical bar. use — (SHIFT + BACKSLASH) to specify a vertical bar. use l for left align type and c for centered . like this:

first	second
third	four

  for double bars use hline tag twice and add double backslashes between columns.

first	second
third	four

- Table

  Table it's a floating environment (float = LaTeX choose where to put it)

first	second
third	fourth

  Table 1: this is a table

  this is a references to table 1

7 Graphics

for including a picture use this tag.



7.1 Graphic Float Figure

we can use it to reference it.



Figure 1: Caption

we will talk about more about graphics later.

8 BibTeX References and Citations

we use the bib file for citations.

I read an article [2]. I read a book [3]. I visited this site [1].

References

[1] learn latex. https://www.overleaf.com/learn/latex.

[2] ali. latex. *anyCO*, 2(1):10–20, 2012.

[3] kim. *basic latex*. PublishCO, 2006.

in other softwares might see a [?] on pdf you should see the console for warning. mostly you must re run again(you can fixit by using a online editor like overleaf). if you see bbl file it's output file of our bib file.

you can also referencing by mendelay application. you can search it for more info.

NOTE:

you can put thousand items in the bib file but only some of it will be put in the document that are already referenced.

9 Mathematical Symbols and Equations

to create a math environment use $ math eq $ to create a math environment.

for more symbols you can search each. they most are tags but some of them are not tags.

leg	less than or equal
geq	greater than or equal
^	power
*	times
cup	union symbole
alpha	lowercase alpha
exists	the exist character
rightarrow	right arrow
gets	left arrow

you can search the internet for more symbols

examples

here are some of the math equations. $a^2, b = 5, a * b = 8$, this is inline.

$$[htbp]2^3 + 6 * 12 \leq 11 \cup X\alpha 25\exists 5 \rightarrow \tag{1}$$

10 Algorithms and Pseudocode

there are multiple environment and packages but we choose algpseudocode package. note that this is just a preview or a brief, for more info search the internet. see the source file to understand how to write.

if $A = B$ **then**
    $A \leftarrow 10$
    continue
else
    while $A! = 5$ **do**
        $A \leftarrow A * B + (A - B)$
        A++
    end while
end if

11 Sty Files

usually for journals and others. journals have their own style and class files which makes it easy to typeset your doc without even having to read the requirements!

an example for style files can be found in this link:
`https://www.ieee.org/conferences/publishing/templates.html`

within their zip file there is also some tex file that have lots of comments, which packages we can use and more. we can also just change the section for our writing so it's useful and we dont need to read the requirements we just change the text in it.

12 Advance Feature for Tables and Graphics

- FOR TABLES

  use the package multirow to create this tables:

cs135	C++	this is a specified size column
cs235	java	

Table 2: specific column size

multicolumn and multirow table :

	RANGES	
	X	Y
xy	5	6
	2	4

Table 3: muticolumn and multirow

- FOR GRAPHICS

  in source file I will show you how to create sub-figures:

  first we need to packages (caption-subcaption)

  note that you can also reference the sub-figures

  % in here means end of one fegure and the next figure should be kept with this figure side by side





(a) sub fig 1 (b) sub fig 2

Figure 2: sub figures

now their references. this is figure 2, this is the first sub-figure 2a, this is the second sub-figure 2b.

13 Separating Our Work in Multiple Files

use the input tag to have the text from a different file. no need for that file to have essential setups cause we have them right here but you can use package if you want to.

13.1 this is an imported subsection

this text belong to different file.

14 Manipulating and Redefining Commands

there are few ways to cotrol the typesetting output.
we already see how to make a continuing list in section 4 by help of a package.
continuing list —> every time we open an environment it starts counting order but we want to resume the counting from the last environment.
another way do do it:
by the help of the set counter tag we can do just like that.(no package needed)

1. first
2. second

changing the numbering format for tables:
use the renewcommand tag for changing some specific typeset settings.

A. one
B. two
   (I) three

for further knowledge visit this link `https://www.overleaf.com/learn/latex/Lists`
also for page numbering visit this link `https://www.overleaf.com/learn/latex/Page_numbering`

changing the bullets:

→ see

there are lots of packages that allows us to change the typesetting output

15 More Resources

first you must know that most of the packages are found at CTAN site with docs.

- tabularx package

  let control over tabular environmrnt

- longtable package

  useful if you have a table that going to flow accross 2 pages. also you can determine whether or not that you have a header rowbon your table that is represented on the separate pages or does not repeat just appears once and then rest of the table flows onto another page.

- PSTricks

  let you to create graphics in latex

- templates

  you can visit this site for nice templates `https://www.latextemplates.com/`

- Additional Knowledge

  visit this site for learning new tricks

  `https://www.overleaf.com/learn`