

A Latex Tutorial

By Daniel Ruatta

Abstract—This LaTeX tutorial will introduce LaTeX, creating a .tex file, sections, body text, tables, figures, mathematical formulas, acknowledgements, and references.

I. INTRODUCTION

This tutorial is designed to teach a novice engineering student how to create a document in LaTeX, and has been created in LaTeX. It uses an IEEE formatting template from Overleaf.com.

This tutorial will be helpful because it will give students a powerful tool to create streamlined lab reports for their future labs. Engineering classes generally have 4-8 labs, each requiring a 20+ page lab report. LaTeX allows engineering students to create these lab reports as quickly as possible, and has the potential to create reports that are much neater and well-formatted than Google Docs or Microsoft Word.

All engineering students should learn LaTeX because other word processors have many tools that are not easily accessible due to most users not needing them. As lab reports can be lengthy, complex, and full of diagrams, graphs, and photos, students will need a tool that can easily handle all of the above problems.

II. CREATING A .TEX FILE

To create a .tex file, you will need to go to Overleaf.com and click the "Create a New Paper" button. This will allow you to create a new paper using the sample template on Overleaf. Once you have done this, click the Menu icon at the top of the page, and select Project. This will bring up the option to download your project as a .zip file. Click "Download as ZIP" so that your paper is zipped to your Downloads folder along with any project configuration (.cls) files. The .tex file will be the file you edit.

A. Environments

- The `\begin{}` command signifies the beginning of your text, and will contain the majority of your verbiage until the `\end` command closes your document.

- The `\begin{}` command also signifies the end of the preamble, a space for formatting your paper.

The `\end{}` command is used because LaTeX offers the writer the ability to use commands after his or her paper is complete, such as create an index. It also gives the writer a place to insert important comments for future editors, particularly because after the `\end{document}` command, LaTeX will not typeset comments.

B. Reserved Characters

There are several special characters that, if directly put into the LaTeX text editor, do not get printed. The reason for this is that LaTeX needs certain characters to relay formatting changes. The reserved characters that we will be discussing are the Backslash (`\`), the Tilde (`~`), the Double Backslash (`\\`), and the Percent Symbol (`%`).

1) The Backslash: `\`

The backslash is used to enter special characters in your LaTeX file. Because of this, it cannot be used directly the same way a consonant or vowel can be used. Instead, the text `\textbackslash` must be used in order to enter a backslash your text file. If you simply wish to use the backslash as part of a special formatting character, enter it before your command (ex: `\~{}` is used to create a Tilde).

2) The Tilde: `~`

The Tilde is another special character that cannot be used by simply typing "`~`". The reason for this is the `\~` command is used to add a Tilde onto a character (ex: `\x`).

3) The Double Backslash: `\\`

The double backslash is used for line breaking. One misconception that a new user might have is that if a single backslash is used for entering commands, then a backslash followed by another backslash would create the following: `\.` This is incorrect; However, the simplicity of using the double backslash to create a line break is very convenient, and should be used at the end of most large chunks of text in order to create separation and neatness within a LaTeX file. One incorrect usage of the double backslash is right before another command that uses a backslash. Even if there is white space and/or comments in between the double backslash and the command, the compiler will throw an error. The workaround for this is to put the double backslash at the end of the paragraph you type, right after the final period.

4) The Percent Symbol: `%` —

The percent symbol is used for adding comments to your LaTeX file that can only be seen during the editing process. Comments are very helpful for several reasons: They are a different color than most text (blue), which means they can add the amount of spacing necessary for an editor to understand where one paragraph ends and another begins. They are also important when a document becomes too complex for an editor to understand at a glance. By adding comments, editors can explain how one section ties into

another, and prevent future edits from overriding important information.

C. *Displaying the above characters*

We have several options for displaying the above characters. One option is to use the `\verb` command, which allows the writer to display any text inside the box (—) following the `\verb` command.

We can also use the `\text` command, which allows us to display several of the above characters. `\textbackslash` allows us to display the backslash, for example.

D. *Preamble*

- We specified a `\documentclass[letterpaper, 10 pt, conference]{IEEECONF}` earlier. When we specified that document class, we began the *preamble*. The preamble can contain many different `\commands` that can change the structure and formatting of the remainder of the document. The end of the preamble is signified by the `\begin{document}` command. Between this command and the `\end{document}` command will be the text and commands that make up the majority of your document.

III. SECTIONS

A. *Subsections*

IV. BODY TEXT

A. *Paragraphs*

B. *Content*

V. TABLES

VI. FIGURES

VII. MATHEMATICAL FORMULAS

VIII. HOW TO: ACKNOWLEDGEMENTS

IX. HOW TO: REFERENCES

X. CONCLUSIONS

ACKNOWLEDGMENT

- Overleaf.com, for the template

APPENDIX

Appendixes should appear before the acknowledgment.

- Any sources?

Overleaf.com

References are important to the reader; therefore, each citation must be complete and correct. If at all possible, references should be commonly available publications.