A First Set of LaTeX Resources

This page suggests documentation, add-on components, and other resources for a beginning LaTeX user.

The links here are to freely available materials, so you can click to see the documentation online. Where the documentation is also available offline in a typical TeX installation, we provide its name as an end note. View it by running '`texdoc` *name*' in a terminal.

Starting

To run LaTeX, you must use an online service or install a distribution. Online services are commercial; find them by entering 'online latex' in a search engine. For distributions, your choices are TeX Live on a Unix system, including GNU/Linux, or on Windows, or the related MacTeX on Macintosh, or MiKTeX on Windows or a Unix system.

Tutorials The site `learnlatex.org` teaches you the basics in a sound way, and also lets you play with the commands to see the results. For a more traditional document, the most widely recommended one is The Not-So Short Guide to LaTeX 2$_\varepsilon$, available in many languages.[1]

Many people use LaTeX to write mathematical text and for this the premier choice is from the American Mathematical Society. See their Getting up and running with AMS-LaTeX,[2] and more detail is in Users Guide for the `amsmath` package.[3]

Documentation

References The nearest thing to a general reference for LaTeX is LaTeX 2$_\varepsilon$ unofficial reference manual.[4] Look for symbols in the Comprehensive List of Symbols.[5] And, TUGboat, the journal of the TeX Users Group, has published many articles, at levels from beginner to expert, almost since the inception of TeX.

FAQs Many web pages offer quick help with LaTeX, although they can be out of date. Particularly useful and reliable are the TeX FAQ,[6] as well as TeX Resources on the Web. You can

also get a handy general LaTeX Cheat Sheet,[7] as well as the Math for Undergraduates Cheat Sheet.[8] Also, An essential guide to LaTeX 2$_\varepsilon$ usage[9] helps you develop sound habits, by saying what not to do.

Questions If you are stuck on an issue, the TeX-LaTeX Stack Exchange site and the mailing list texhax@tug.org are where knowledgeable people hang out. You are likely to find an answer in their past discussions, which cover decades, and if not then you can post a question yourself.

Books There are many excellent books about LaTeX. Visit the TeX Users Group's book list for a selection, and for discounts.

Packages

One of LaTeX's strengths is the tremendous number of available add-on packages. This list covers most of what beginners want to do. (There are some comments in parentheses that often come up in conjunction with these recommendations.)

Our archive The Comprehensive TeX Archive Network, CTAN, has the latest official versions of the packages that are in the distributions, along with documentation. Browsing by topic can be very handy.

If you have trouble finding something, it may be the house package of a journal or institution. Look on their web page as well as on CTAN.

Every document To change page size, margins, and orientation, use `geometry`.[10] Get multiple columns with `multicol`.[11]

As referred to above, any document containing significant amounts of mathematics should use the American Mathematical Society's packages `amsmath`[12] and `amsfonts`.[13] Also use their `amsthm`[14] for producing theorem environments. Notes: (1) `amssymb` inputs `amsfonts` so load the former instead of the latter, (2) many authors also use the calligraphic characters in `rsfs`,[15]

(3) get bold math symbols with `bm`,[16] (4) don't load `amsmath` directly, instead get it by loading `mathtools`[17] for some useful improvements, and (4) load `amsthm` after `mathtools`.

Also, include `microtype`.[18] It will make your document have fewer awkward lines.

Inside a document Tweak the layout of lists with `enumitem`.[19]

Enhance captions with `caption`[20] and control floating environments with `float`.[21] (In particular, this package provides the 'H' option to override automatic float placement and put something exactly where you ask. This may cause issues — what if you want to include a two inch tall graphic on a page that has only an inch left? — but it sometimes is what you want.)

Get hyperlinks and turn references into links with `hyperref`[22] (make sure to set it up, as with `\hypersetup{colorlinks=true}`). Have cross-references that say 'Theorem 1.2' instead of just '1.2' with `cleveref`.[23] For URL's and file paths that can break across lines, use `url`.[24] (If you use `hyperref` then note that it has its own commands for the `cleveref` and `url` functions.)

Inside verbatim text, make single quotes come out correctly with `upquote`.[25] For including computer code, the `listings`[26] package is very popular. (Copy and paste for computer code is especially convenient. This is a start for the `listings` package.

```
\lstset{basicstyle=\ttfamily,
        keepspaces=true,
        columns=fullflexible}
```

But it is not a full solution. The results depend on the PDF viewer and worse, if your code line begins with blank spaces then after copy and paste those spaces are gone.)

If you use Python, `pythontex`[27] will show code listings, but it also allows you to execute Python and put the results in your output. Do the same for the *Sage* mathematics software with `sagetex`, and similar support exists for other languages.

There are many packages that add table capabilities, such as multirow entries and breaking across pages. The first package to try is `array`,[28] which lets you define your own column types. To handle scientific units, use `siunitx`[29] (which also has a table column type for aligning on a decimal point).

Make boxes that are colored or framed, such as boxes for theorems, with `tcolorbox`.[30]

Use `babel`[31] for internationalization, including changing the title of the abstract or the bibliography. (Note that LaTeX now defaults to UTF-8 encoded input.)

Finally, when developing a document, you often want to generate filler text. Use `lipsum`.[32]

Color and graphics For colors, use `xcolor`.[33]

To include graphics and do simple manipulations such as resizing, use `graphicx`.[34] Use the JPG format for photos, PNG for other kinds of raster graphics, and PDF for vector graphics. If your graphic is in another format then convert it to one of these three. (Usually in your LaTeX source, you give the file name without the extension, as with `\includegraphics{myplot}`.) Include parts of an outside PDF document with `pdfpages`.[35] Include video or sound using `media9`.[36]

In your plots and graphics, you want that the fonts and notations match your document. You have a few choices. Draw inside your document with Ti*k*Z.[37] You can instead draw using an external command language such as Asymptote,[38] and bring the results in as graphics. And there are other options, such as that the Gnuplot plotting software will output Ti*k*Z commands, and the Inkscape vector graphics editor allows you to embed LaTeX-generated equations.

Front and back matter, headers, footers To style chapter and section titles, use `titlesec`.[39] For page headers and footers, reach for `fancyhdr`.[40] You can tweak the format of tables of contents, lists of figures, etc., with `tocloft`.[41]

For footnotes, use `footmisc`.[42] Make an index with `makeindex`.[43] With `answers`[44] you can send exercise answers to an external file, where you can make them a separate document or include them at the end of the current one.

Bibliographies are a thorny area. Often you have strict requirements, such as from the

MLA.[45] CTAN is a big help here; check out the many styles for both BIBTEX[46] and BIBLATEX.[47]

Special documents Make exams and problem sets with the exam[48] class.

There are many, many resume and CV packages. Start with CTAN's cv topic.

To make presentations, use the beamer[49] class. (However, with this package you are entering another world, where many of the packages discussed here do not work. For example, section title styling happens via a completely different mechanism.)

Fonts and engines

The documentation for font use commands from the LaTeX developers is LaTeX 2_ε font selection.[50]

To move beyond the default fonts, visit the LaTeX Font Catalogue, which includes copy and paste code to make each one work.

Beyond that list, you can also use your computer system's fonts (beware this makes your source file harder to share with friends, though). The background is: to convert LaTeX source to PDF output there are three varieties of the TeX engine. Currently the most common is pdfTeX.[51] For instance, this document was generated with `pdflatex latex-doc-ptr.tex`. Two further developments, XƎTEX,[52] and LuaTeX,[53] can leverage the fontspec[54] package to use your system's fonts, such as OpenType and TrueType fonts, in addition to the ones from your TeX distribution. (Mathematics requires much special tuning, though, so most of the time you cannot use system fonts for math.)

More is on the TeX Users Group's font page.

Writing LaTeX

There are many ways to make writing LaTeX source easier. Most people use a source code editor, such as TeXstudio, or Emacs with the add-on mode AUC-TeX, or TeXShop on a Mac.

Pronunciation

Pronounce LaTeX as "la-tech" or "lay-tech," with emphasis on either syllable. We prefer the first, with emphasis on the first syllable.

Welcome to the community!

One reason that all of these resources are available is the work of the many user groups, including the TeX Users Group. Please consider joining.

Package names, for texdoc

[1] lshort [2] amshelp [3] amsmath [4] latex2e
[5] comprehensive [6] faq [7] latexcheat [8] undergradmath
[9] l2tabuen [10] geometry [11] multicol [12] amsmath
[13] amssymb [14] amsthm [15] rsfs [16] bm [17] mathtools
[18] microtype [19] enumitem [20] caption [21] float
[22] hyperref [23] cleveref [24] url [25] upquote
[26] listings [27] pythontex [28] array [29] siunitx
[30] tcolorbox [31] babel [32] lipsum [33] xcolor
[34] graphics [35] pdfpages [36] media9 [37] tikz
[38] asymptote [39] titlesec [40] fancyhdr [41] tocloft
[42] footmisc [43] makeindex [44] answers [45] mla [46] bibtex
[47] biblatex [48] exam [49] beamer [50] fntguide [51] pdftex
[52] xetex [53] luatex [54] fontspec