# Programming LaTeX — A survey of documentation and packages

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**Abstract**

A survey of programming-related documentation for LaTeX. Included are references to printed and electronic books and manuals, symbol lists, FAQs, the LaTeX source code, CTAN and distributions, programming-related packages, users groups and online communities, and information on creating packages and documentation.

## Contents

## Introduction

Reinventing the wheel may be useful if you think that you can do it better. Worse, though, is not even being aware that the wheel has already been invented in the first place, which can be an embarrassing waste of time. Such can be the case both for a new LaTeX programmer who isn't aware of the many ways things may be done, but also for someone, the author included, who learned LaTeX many years ago but may have missed some of the recent advancements in package code and documentation.

A wealth of information is available, not only in print and online, but also directly embedded in the typical LaTeX distribution. The following is meant to be a broad overview of some of today's resources for LaTeX programmers.

(The latest version of this document is available in the docsurvey package.)

## Printed books

Even in an electronic/online era, printed books still have the advantage of being able to be opened for reference without taking up space on the screen. Printed books also provide extended discussion of useful topics, have extensive human-edited indexes which are more useful than a simple document-wide search function, and some are also available in electronic format.

**LaTeX: A Document Preparation System:**
The classic introduction to LaTeX, in continuous reprint for decades. [1]

**Guide to LaTeX:**
An introduction and more advanced material, including an extensive reference guide. Fourth edition: 2004. [2]

**More Math into LaTeX:**
Updated to a fifth edition in 2016. [3]

**LaTeX Beginner's Guide:**
An overview with numerous examples. [4]

**LaTeX Cookbook:**
More examples. [5]

**The LaTeX Companion:**
Provides extended discussion and examples of the inner workings of LaTeX and numerous useful packages. Second edition: 2004. [6]

**Additional books:**
Listed at the UK TUG FAQ. `http://www.tex.ac.uk/FAQ-latex-books.html`

## Electronic books and documentation

Most of these are provided with the TeX distribution, and may be updated with each release. Access the embedded documentation from a command line using the `texdoc` program.

### TeX

**TeX by Topic, A TeXnician's Reference:**
A reference for TeX. This may be useful for understanding the source code of LaTeX packages, many of which are quite old and written in low-level TeX. [9] (`texdoc texbytopic`)

### LaTeX

**The Not So Short Introduction to LaTeX 2ε:**
Covers introductory material, customizations, and a simple package. [7] (texdoc lshort)

**LaTeX 2ε: An unofficial reference manual:**
A thorough but concise reference manual for LaTeX 2ε, available in several languages. [8]
(texdoc -l latex2e-help)

**LaTeX WikiBook:**
An online book, includes information about creating LaTeX packages and classes.
https://en.wikibooks.org/wiki/LaTeX

### LuaLaTeX

**A guide to luaLaTeX:**
An introduction. (texdoc lualatex-doc)

**LuaTeX Reference:**
The full manual. (texdoc luatex.pdf)

### XeLaTeX

**The XeTeX reference guide:**
A summary of additional features. (texdoc xetex-reference)

**Font-change-xetex:**
Macros for using fonts. (texdoc font-change-xetex)

### Symbol references

These are lists of the LaTeX commands which produce symbols.

**Comprehensive LaTeX Symbol List:**
More than 14,000 symbols and LaTeX commands. [10]
(texdoc symbols-letter)
(texdoc symbols-a4)

**Every symbol (most symbols) defined by unicode-math:**
Unicode math symbols. [11] (texdoc unimath-symbols)

### Source code

The source code for LaTeX 2ε itself is also included in the distribution.

**The LaTeX 2ε sources:**
Occasionally useful for figuring out how something really works. [14]
(texdoc source2e)

**List of internal LaTeX 2ε macros useful to package authors:**
A list of the core LaTeX macros, each of which is linked to the source code. [15] (texdoc macros2e)

### FAQs

**UK TUG FAQ:**
A wide-ranging list of frequently-asked questions. [12] `(texdoc letterfaq)` `(texdoc newfaq)`

**Visual LaTeX FAQ:**
Click on a visual element to learn how it is programmed. [13]
`(texdoc visualFAQ)`

## Accessing embedded documentation

A large amount of documentation is included in a TeX distribution. Most can be accessed with the `texdoc` program. Use `texdoc -l name` to select from many choices of matching package, file, or program names. In some cases the same document is available in both letter or A4 paper sizes, or in several languages.

The program `kpsewhich` may be used to find out where a file is located. `kpsewhich filename` searches for and returns the path to the given filename.

`kpsewhich` can also return directories, such as:

```
kpsewhich -var-value TEXMFROOT
kpsewhich -var-value TEXMFDIST
kpsewhich -var-value TEXMFLOCAL
```

Some package authors choose not to include the source code in the package documentation. To view the source code:

1. To locate and read a package's `.sty` file:

   ```
   kpsewhich package.sty
   ```

   Usually these files have their comments removed, so it is better to use the `.dtx` file instead.

2. The `.dtx` file is usually available, and will have the package's source code.

   ```
   kpsewhich package.dtx
   ```

   The comments are not yet typeset and so will not be as easily read.

3. To typeset the documentation with the source code, copy the `.dtx` file and any associated image files somewhere local and then look for `\OnlyDescription` in the source. This command tells the ltxdoc package not to print the source code.

4. Remove `\OnlyDescription`, then process the `.dtx` file with

   ```
   pdflatex package.dtx
   ```

   Barring unusual circumstances, this will create a new documentation `.pdf` file with the package source code included.

## Obtaining packages — Comprehensive TeX Archive Network (CTAN)

The Comprehensive TeX Archive Network (CTAN) provides a master collection of packages. A search function is available, which is useful when you know the name of a package or its author, and a list of topics is also provided. There are so many topics, however, that finding the right topic can be a problem in itself. One useful method to find what you are looking for is to search for a related package you may already know about, then look at its description on CTAN to see what topics are shown for it. Selecting these topics then shows you related packages. [16]

## Packages useful for programming LaTeX

A number of packages are especially useful for LaTeX programmers: (`texdoc <packagename>`)

**xifthen:** Conditionals.

**etoolbox:** A wide range of programming tools, often avoiding the need to resort to low-level TeX.

**etextools:** Adds to etoolbox. Strings, lists, and more.

**xparse:** Define macros and environments with flexible argument types.

**environ:** Process environment contents.

**arrayjobx, fifo-stack, forarray, forloop, xfor:** Programming arrays, stacks, and loops.

**iftex:** Detect TeX engine.

**ifplatform:** Detect operating system.

**xstring:** String manipulation.

**keyval, xkeyval, kvsetkeys:** Key/value arguments.

**pgfkeys, pgfkeyx:** Another form of key/value arguments.

**kvoptions:** Key/value package options.

**expl3:** LaTeX3 programming.

**l3keys, l3keys2e:** Key/value for LaTeX3.

**chktex:** Locates typographic errors.

**CTAN topic macro-supp:** An entire topic of useful programming macros.

## Creating and documenting new packages

### How-to

Documentation for those interested in creating their own package or class:

**How to package your LaTeX package:**
A tutorial. [17] (`texdoc dtxtut`)

**LaTeX 2$_\varepsilon$ for class and package writers:**
Programming a package or class. [18] (`texdoc clsguide`)

**The doc and shortvrb packages:**
Packages for documenting packages. [19] (`texdoc doc`)

**The DocStrip program:**
The program which processes `.dtx` and `.ins` files to generate documentation and `.sty` files. [20] (`texdoc docstrip`)

### Published articles about creating LaTeX packages

Related articles from *TUGboat*:

**Rolling your own Document Class: Using LaTeX to keep away from the Dark Side:**
An overview of the article class. [21]

**Good things come in little packages:**
**An introduction to writing `.ins` and `.dtx` files:**
How and why to create your own `.dtx` and `.ins` files. [22]

**How to develop your own document class —**
**our experience:**
A comparison of developing class vs. package files. [23]

## Users groups

**TeX Users Group:** http://tug.org

**List of international users groups:** http://tug.org/usergroups.html

## Online communities

**English forums:**

**TeX — LaTeX Stack Exchange:** http://tex.stackexchange.com/
Almost any question has already been asked, and a quick web search will find answers, ranked by vote.

**LaTeX Community:** http://www.latex-community.org/
A traditional forum with quick replies to your questions

**German forums:**

**TeXwelt:** http://texwelt.de/wissen/

**goLaTeX:** http://golatex.de/

**Mailing lists:** http://tug.org/mailman/listinfo
Several dozen, spanning a wide range of TeX-related topics.

**Newsgroup:** comp.text.tex

## Distributions — LaTeX for various operating systems

| | |
|---|---|
| **TeXLive:** http://tug.org/texlive/ | Unix and Windows |
| **MiKTex:** https://miktex.org/ | Windows and Mac |
| **proTeXt:** http://tug.org/protext/ | Windows |
| **MacTex:** http://tug.org/mactex/ | Mac |

## Change log

**2017/03/06:**
Initial version.

**2017/10/04:**
Added users groups, mailing lists, distributions, LuaTeX, XeTeX, chktex. Organization and formatting improvements.

## References

[1] LaTeX: A Document Preparation System, Leslie Lamport, second edition, Addison Wesley, 1994, ISBN 0201529831.

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[3] More Math Into LaTeX, George Grätzer, 5th ed., Springer, 2016, ISBN 3319237950.

[4] LaTeX Beginner's Guide, Stefan Kottwitz, Packt Publishing, 2011, ISBN 1847199860.

[5] LaTeX Cookbook, Stefan Kottwitz, Packt Publishing, 2015, ISBN-13 9781784395148, http://latex-cookbook.net/

[6] The LaTeX Companion, Frank Mittelbach, Michel Goossens, Johannes Braams, David Carlisle and Chris Rowley, second edition, Addison-Wesley, 2004, ISBN 0201362996.

[7] The Not So Short Introduction to LaTeX $2_\varepsilon$, Tobias Oetiker, https://ctan.org/pkg/lshort

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[9] TeX by Topic, A TeXnician's Reference, Victor Eijkhout, Addison-Wesley UK, 1991, ISBN 0201568829, http://eijkhout.net/texbytopic/texbytopic.html

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[19] The doc and shortvrb packages, Frank Mittelbach, https://ctan.org/pkg/doc

[20] The DocStrip program, Frank Mittelbach, Denys Duchier, Johannes Braams, Marcin Woliński, and Mark Wooding, https://ctan.org/pkg/docstrip

[21] Rolling your own Document Class: Using LaTeX to keep away from the Dark Side, Peter Flynn, *TUGboat* 28:1 (2007), pp. 110–123, http://tug.org/TUGboat/tb28-1/tb88flynn.pdf

[22] Good things come in little packages: An introduction to writing .ins and .dtx files, Scott Pakin, *TUGboat* 29:2 (2008), pp. 305–314, http://tug.org/TUGboat/tb29-2/tb92pakin.pdf

[23] How to develop your own document class — our experience, Niall Mansfield, *TUGboat* 29:3 (2008), pp. 356–361. http://tug.org/TUGboat/tb29-3/tb93mansfield.pdf