Publishing with LaTeX

Could your next report, article, book, paper, review, or essay benefit from using LaTeX? Do you need to be able to exchange reliable documents with colleagues working on other types of computer, without loss of formatting?

- ❑ Default styles give you immediate, automatic draft formatting for common types of document.
- ❑ Powerful automation features handle cross-references, bibliographic citations, tables of contents, indexes, and glossaries with ease.
- ❑ Automated formatting of formulae, designed by one of the world's leading mathematicians.
- ❑ Produces industry-standard PostScript (PS) and Acrobat (PDF) files.
- ❑ Available in free and commercial versions (Open Source or with paid support).
- ❑ Heavily supported via the Internet, with user groups in many countries.
- ❑ Huge range of fonts and languages supported, with floating and fixed accents, automatic hyphenation, and language-based typographic rules.
- ❑ Journal and book style files available from leading publishers.
- ❑ Available on all platforms from the smallest PC or Mac to the biggest workstation, mainframe, or supercomputer — even some PDAs!
- ❑ Completely portable between systems — document files are all plain text (ASCII or Unicode) and can be edited and processed on any platform, even over a network.

I find LaTeX a powerful instrument for generating elaborate typographic layouts quickly and reliably. They are available for revision for years afterwards, without worries about software versions or compatibility. LaTeX is demanding in its requirements but it relieves me of any concern about the finished project.

Séamus Ó Direáin, Lexicographer

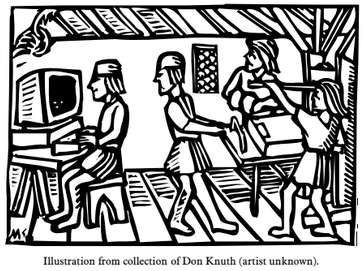


Illustration from collection of Don Knuth (artist unknown).

Typefaces

Whether you're using Windows or Unix (including Apple Mac and Linux systems), LaTeX works with any Type 1 outline (PostScript) or Type 3 bitmap (METAFONT). In PDF documents, you can also use TrueType and OpenType fonts. This gives you access to tens of thousands of typefaces, both free and commercial.

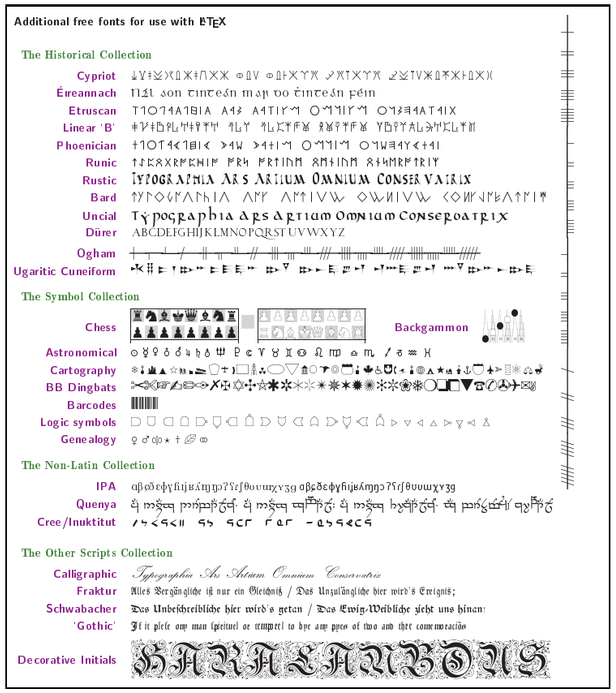
The standard Adobe '35' core PostScript fonts (including Times, Palatino, Century Schoolbook, Helvetica, Zapf Calligraphic etc.) can be used even without a PostScript printer, thanks to the GhostScript and GSview programs which print PostScript output on any printer.

The typographics of the TeX formatting engine are very precise: it works internally in microunits (≈53.6Å), resulting in great accuracy in positioning. LaTeX can use Anglo-American, Didot, or Adobe points, or metric or imperial units, or any mixture.

LaTeX also comes with a collection of specialist typefaces for technical, linguistic, and literary typesetting (see adjoining sampler), and the complete mathematics fonts of Computer Modern, Euler, Concrete, and Times.

Non-Latin types include Japanese, Chinese, Devenagari, Urdu, Thai, Vietnamese, Coptic, Greek, and many other languages and alphabets, including mixed bi-directional Arabic and Hebrew.

The fontmaking programs METAFONT and METAPOST are companions to all TeX systems and can be used to design and implement your own typefaces or special symbols.



Mathematics

TeX-based systems are the only ones capable of automated mathematical formatting. Expressions are entered in symbolic form, regardless of complexity, and are automatically spaced and sized according to mathematicians' standards:

```
E(n_{g+1}'|n_i',n_i'';\,1\le i\le g)=(N'-N_g')\left[1-\left\{\left(1-\frac{c}{cN'+N''}\right)^{n_g'd}\left(1-\frac{c}{cN''+N'}\right)^{n_g''d}\right\}\right]
```

$$E(n'_{g+1}|n'_i, n''_i;\, 1 \le i \le g) = (N' - N'_g)\left[1 - \left\{\left(1 - \frac{c}{cN' + N''}\right)^{n'_g d}\left(1 - \frac{c}{cN'' + N'}\right)^{n''_g d}\right\}\right] \qquad (10.57)$$

After Rapoport (in Bartholomew, D.J. *Stochastic Models for Social Processes*, 2nd. ed., John Wiley & Sons, 1973, p. 368.)

Tables, Figures, and illustrations

LaTeX's tables and figures follow the standard publishers' practice of 'floating', so if there is no room on the current page, they automatically adjust to the next. Automated crossreferencing means that tables and figures can be moved around the document and will always renumber themselves and all their points of reference accordingly.

There are powerful controls for tabular settings, allowing both simple and complex designs, with fixed or auto-adjusting spacing, row and column spans, and colouring. Cells, rows, and columns can be aligned top/bottom/middle/left/right/centre or on a decimal point, or formatted as paragraphs.

TABLE 6.2: CASES FOR WHICH THE QUANTILE AND KEMSLEY'S METHODS WERE IMPOSSIBLE, CLASSIFIED BY THE SIZE OF σ

σ	Method of quantiles		Kemsley's method		Total no. of samples available
	5%	10%	5%	10%	
0.2–0.4	[illegible]	[illegible]	[illegible]	[illegible]	20
0.5–0.7					22
0.8–1.0	—	1	2	15	23
All samples	2	2	4	23	65

After Aitchison, J. and J.A.C. Brown, *The Lognormal Distribution*, CUP, 1976, p. 62.

Spacing can be very precisely aligned to provide better visual appeal. Formal tables and Figures are automatically numbered, and can be captioned, labelled, crossreferenced, and included in a List of Tables and List of Figures.

Complex tabular matter can span pages and can be printed landscape (sideways) while retaining the portrait (upright) orientation of the caption and pagenumber. Simple tabular matter can appear anywhere, and stays where it is put (does not float like a formal table), and can also be used for the construction of logos.

Figures can contain textual or graphical illustrations. Pictures can be included with scaling, rotation, and clipping: the LaTeX default uses the industry standard Encapsulated PostScript (EPS) format, while pdfLaTeX can use JPG, PNG, or PDF graphics.

ImageMagick, *GIMP*, *Inkscape* or other graphics packages can be used for drawing and converting images.

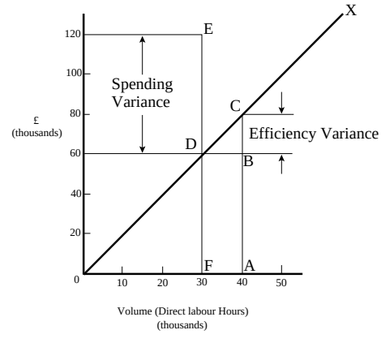
LaTeX also has a CAD-like vector language for simple diagrams, and there are packages for typesetting musical notation, electronic circuits, flowcharts, and other graphical notations.

Crossreferences

The crossreferencing features let you give a name to any thing you want to refer to (table, figure, section, chapter, page, item, etc), and then refer to it by that name anywhere in the document.

Each crossreference is automatically updated so that no matter how much you edit the text, the numbers remain correct. The same method is used for automated indexing, glossary, table of contents, list of figures, list of tables, and bibliographic references.

The BibTeX bibliographic database lets you keep all your references separately from your documents, and have them extracted and automatically formatted to any of the standard styles, using numeric, in-text, footnote, or endnote methods.



After R.J. Bull, *Accounting in Business*, Butterworths, 2nd. ed., 1972, p. 191.

Persistence and reliability

LaTeX was designed to be independent of any particular manufacturer, make, or model of computer or printer. Unlike some wordprocessor manufacturers' proprietary file formats, LaTeX uses plaintext (ASCII or Unicode) files which can be created and updated with any editor anywhere, and moved between different systems without danger of information loss or corruption.

The system has been carefully designed so that documents written years ago can still be typeset. Because the file format has remained virtually unchanged, your investment in intellectual property cannot be damaged by vendors' arbitrary or planned obsolescence, or by changes in versions or formats.

> LaTeX material originally produced for paper printing, no matter how long ago, can quickly and easily be made available for today's Web access. I have just recently had to provide a journal from 1987–1996 in a format available for the Web. The opening page was converted into HTML for quick scanning on the Web, while the complete articles, with all typesetting and font features (including Hebrew, phonetics, and Greek), were available for viewing in PDF just by re-running the LaTeX files.
>
> The biggest advantage in publishing production is that similar coding of files means anyone can do any journal — there is no need to learn new sets of commands for style variations. Changes in platforms have no effect on production as LaTeX is available for all main operating systems.
>
> It is possible to separate the writing tasks (creation of text) from the design/layout issues (spacing, fonts, etc), which allows the author simply to identify types of elements (heading levels, foot/endnotes, citations, etc) without getting bogged down trying to remember the text shape and font selections for each element.
>
> *Christina Thiele, CCS Publishing*

Documentation

Peter Flynn. *Formatting Information — a Beginner's Guide to LaTeX 2ε*. Silmaril Consultants, `http://www.ctan.org/tex-archive/info/beginlatex/`, 3.6 edition, April 2005.

Michel Goossens and Sebastian Rahtz. *The LaTeX Web companion*. Tools and Techniques for Computer Typesetting. Addison-Wesley Longman, Reading, MA, 1999. With Eitan M. Gurari and Ross Moore and Robert S. Sutor.

Michel Goossens, Sebastian Rahtz, and Frank Mittelbach. *The LaTeX Graphics Companion*. Tools and Techniques for Computer Typesetting. Addison-Wesley, Reading, MA, 1997.

Donald Knuth. *The TeXbook*. Addison-Wesley, Reading, MA, 1986.

Leslie Lamport. *LaTeX, a document preparation system*. Addison-Wesley, Reading, MA, 2nd edition, 1994.

Frank Mittelbach, Michel Goossens, Johannes Braams, David Carlisle, and Chris Rowley. *The LaTeX Companion*. Addison-Wesley, Reading, MA, 2nd edition, 1994.

Tobias Oetiker, Hubert Partl, Irene Hyna, and Elisabeth Schlegl. The (not so) short introduction to LaTeX 2ε. Technical Report 3.7, Comprehensive TeX Archive Network, `http://www.ctan.org/`, Apr 1999.

Oren Patashnik. BIBTeXing. Technical report, TeX Users Group, Portland, OR, Feb 1988.

The book by Lamport is the user manual for LaTeX: make sure you get the second edition for LaTeX 2ε. The *Companion* is more advanced, but useful if you want to implement your own customised document designs. Knuth's original *TeXbook* is of interest mainly to computer scientists and typographic programmers who need to know the finest detail.

There are dozens of other books, ranging from the online introductions, *Formatting Information* and *The (not so) short introduction to LaTeX 2ε*, to the professional mathematician's *The Joy of TeX* and the typographer's *Digital Typography*.