LaTeX

Sophisticated professional typesetting for business and academic publishing

The ideal solution for your document formatting and database or XML publishing requirements

The ultimate in portable typesetting: LaTeX runs on any computer and produces timely, accurate output in publication quality on your desktop printer or business typesetter.

LaTeX is completely free, and has been the tried and tested solution for over 25 years.

LaTeX is in use by leading publishers, documentation specialists, and technical and academic users worldwide.

What they say about LaTeX

I was getting increasingly exasperated with the limitations presented by wordprocessing programs when LaTeX came into my life and allowed me to do all those things I previously could only dream of, from unusual symbols to complicated layout. I strongly recommend it to anybody interested in producing a professional-looking document! *Petra Hellmuth, Language Specialist*

I use pdfLaTeX and METAFONT not only because I need them to create my presentations, lecture notes and papers but also because it's fun! Entering a math equation in Powerpoint is a pain in the neck: with pdfLaTeX and METAPOST it is a lot easier because you can change the style of what is to be displayed. I have a lecture class from which I generate a lecture presentation *and* lecture notes all from the same source: I can add text which appears in one or both of the documents. *Marc van Dongen, Computer Scientist*

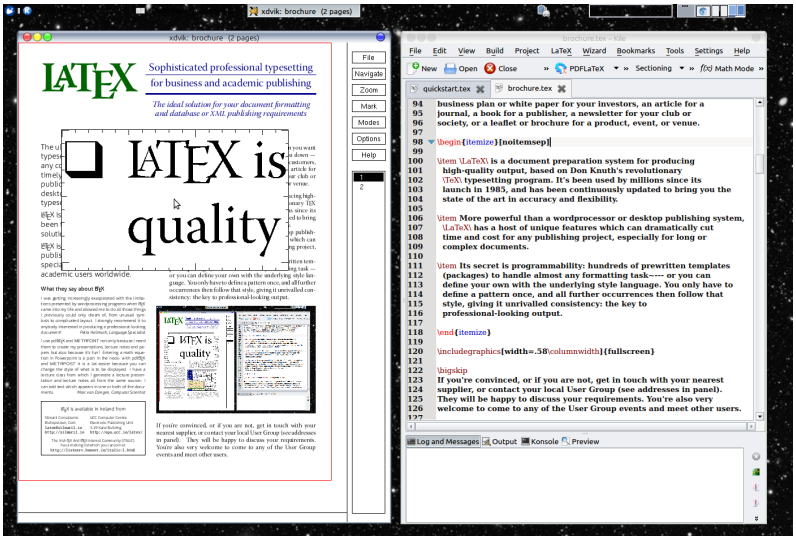
LaTeX is available in Ireland from

Silmaril Consultants	UCC Computer Centre
Bishopstown, Cork	Electronic Publishing Unit
latex@silmaril.ie	3.19 Kane Building
http://silmaril.ie	http://epu.ucc.ie/latex/

The Irish TeX And LaTeX Interest Community (ITALIC) has a mailing list which you can join at
http://listserv.heanet.ie/italic-l.html

IF you need to produce a document for publication you want robust, professional software which won't let you down — whether it's an annual report, a manual for your customers, a business plan or white paper for your investors, an article for a journal, a book for a publisher, a newsletter for your club or society, or a leaflet or brochure for a product, event, or venue.

- LaTeX is a document preparation system for producing high-quality output, based on Don Knuth's revolutionary TeX typesetting program. It's been used by millions since its launch in 1985, and has been continuously updated to bring you the state of the art in accuracy and flexibility.
- More powerful than a wordprocessor or desktop publishing system, LaTeX has a host of unique features which can dramatically cut time and cost for any publishing project, especially for long or complex documents.
- Its secret is programmability: hundreds of prewritten templates (packages) to handle almost any formatting task — or you can define your own with the underlying style language. You only have to define a pattern once, and all further occurrences then follow that style, giving it unrivalled consistency: the key to professional-looking output.



If you're convinced, or if you are not, get in touch with your nearest supplier, or contact your local User Group (see addresses in panel). They will be happy to discuss your requirements. You're also very welcome to come to any of the User Group events and meet other users.

Publishing with LaTeX

Could your next report, white paper, article, book, paper, review, or essay benefit from using LaTeX? Do you need to be able to exchange documents with colleagues using 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 computer scientists.
- ❑ Industry-standard Acrobat (PDF) and PostScript (PS) output.
- ❑ Available in Open Source and commercial versions.
- ❑ Strongly supported via the Internet, with user groups in many countries, and by business-level consultants and vendors.
- ❑ Huge range of fonts and languages supported, with floating and fixed accents, hyphenation, and language-based typographic rules.
- ❑ Journal and book style files available from leading publishers.
- ❑ Available on almost all platforms: PDAs, smartphones, and tablets; laptops and desktops; minicomputers, mainframes, and supercomputers.
- ❑ Completely portable between systems — document files are all plain Unicode and can be edited and processed on any supported platform.

Mathematics

Automated mathematical formatting uses a symbolic notation, regardless of complexity. Spacing and sizing is done to mathematicians' standards, so this:

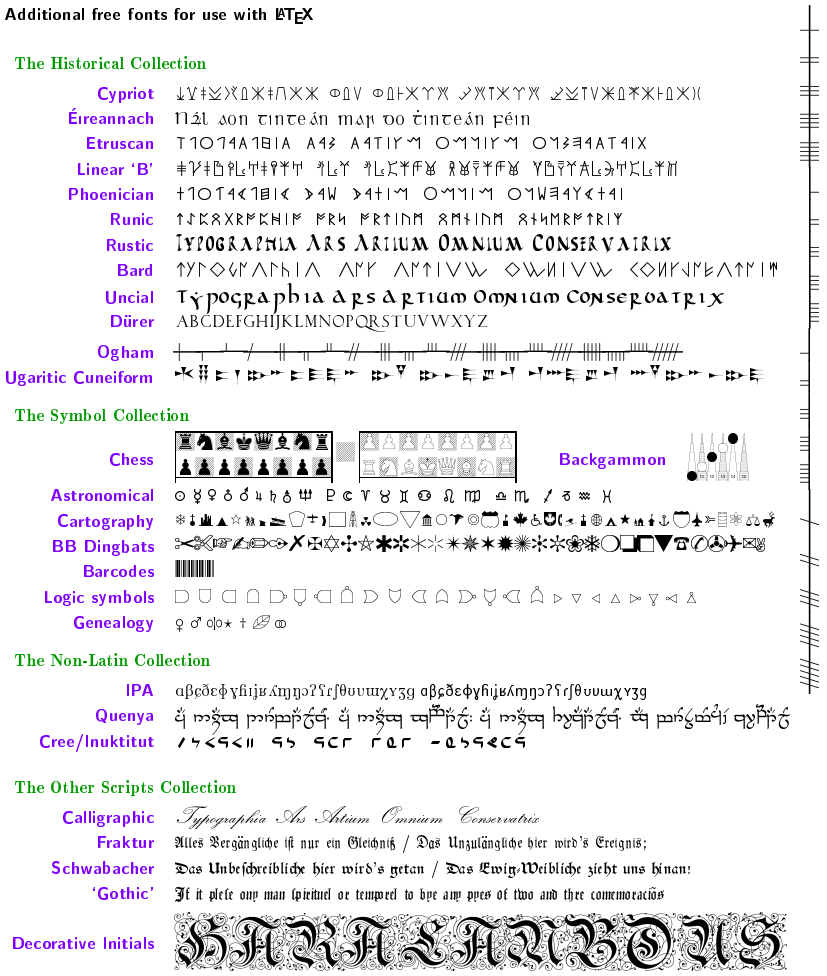
```
E(n_{g+1}'|n_i',n_i'';\,1\le i\le g)=(N'-
N_g')\left[1-\left\{\left(1-\frac{c}
{cN'+N''}\right)^{n_g'd}\left(1-\frac{c}
{cN''+N'}\right)^{n_g''d}\right\}\right]
```

results in the equation below. Graphical LaTeX-based systems such as LyX and *Scientific Word* have built-in equation editors for constructing expressions with the mouse and menus.

Typefaces

Whether you're using Windows or Unix (including Apple Mac OS X and GNU/Linux systems), standard LaTeX works with any Type 1 outline (PostScript) or Type 3 bitmap (METAFONT). Using the XeLaTeX processor (included on the DVD), you can also use all your 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 (Times, Palatino, Century Schoolbook, Helvetica, Zapf Calligraphic. etc) are provided by default; with the mathematics fonts of Computer Modern, Euler, Concrete, and Times; and a range of decorative and specialist typefaces for technical, linguistic, and literary typesetting.



Non-Latin types include Japanese, Chinese, Devanagari, Urdu, Thai, Vietnamese, Coptic, Cyrillic, Greek, and many other languages and alphabets, including mixed bi-directional Arabic and Hebrew. Extensive user group coverage world-wide provides native-language support for non-Latin typesetting.

The fontmaking programs METAFONT and METAPOST come with all TeX systems for designing and implementing your own typefaces or special symbols.

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

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

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

Tables

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

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				[illegible]	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.

There are powerful tabular controls for both simple and complex designs, with fixed or auto-adjusting spacing which 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 while retaining the portrait orientation of the caption and pagenumber. Simple tabular matter can appear anywhere, without being a formal numbered table.

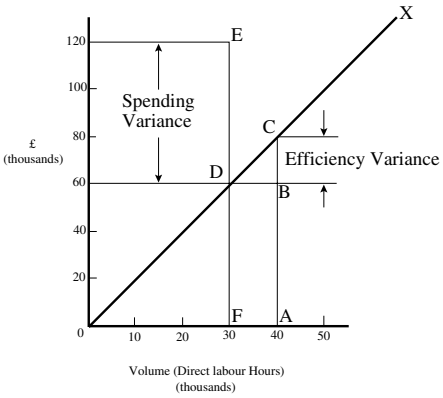
Crossreferences

The crossreferencing features let you name anything you want to refer to (table, figure, section, chapter, page, item, etc), and then use that name anywhere in the document. This lets each crossreference automatically update its location so that no matter how much you edit the text, the references 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 store references separately from documents, and the BibLaTeX system extracts and automatically formats them to any of the standard styles, including numeric, in-text, footnotes, or endnotes.

Figures and illustrations

Figures can contain textual or graphical illustrations. Pictures can be included with scaling, rotation, and clipping, using industry standard PDF or EPS vector formats for diagrams, or PNG or JPG bitmaps for pictures.



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

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

Illustration from collection of Don Knuth (artist unknown)

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

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 is stable, your investment in intellectual property cannot be damaged by vendors' arbitrary or planned obsolescence, or by changes in versions or formats.

Documentation

Flynn, P. (2005). *Formatting information — a beginner's guide to LaTeX 2ε* (3.6 ed.). `http://www.ctan.org/tex-archive/info/beginlatex/`: Silmaril Consultants.

Goossens, M., & Rahtz, S. (1999). *The LaTeX Web companion*. Reading, MA: Addison-Wesley Longman. (With Eitan M. Gurari and Ross Moore and Robert S. Sutor.)

Goossens, M., Rahtz, S., & Mittelbach, F. (1997). *The LaTeX graphics companion*. Reading, MA: Addison-Wesley.

Knuth, D. (1986). *The TeXbook*. Reading, MA: Addison-Wesley.

Lamport, L. (1994). *LaTeX, a document preparation system* (2nd ed.). Reading, MA: Addison-Wesley.

Mittelbach, F., Goossens, M., Braams, J., Carlisle, D., & Rowley, C. (1994). *The LaTeX Companion* (2nd ed.). Reading, MA: Addison-Wesley.

Oetiker, T., Partl, H., Hyna, I., & Schlegl, E. (1999, Apr). *The (not so) short introduction to LaTeX 2ε* (Tech. Rep. No. 3.7). `http://www.ctan.org/`: Comprehensive TeX Archive Network.

Patashnik, O. (1988, Feb). *BIBTeXing* (Tech. Rep.). Portland, OR: TeX Users Group.

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*.

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

In principio erat verbū: 7 verbū erat apud deū: et de⁹ erat verbū. Hoc erat in principio apud deū. Omia p ipm facta sunt: 7 sine ipo factum est nichil. Quod factū est in ipo vita erat: 7 vita erat lux hominū: et lux in tenebris lucet· 7 tenebre eā nō comphenderūt. Fu-

Typographic reconstruction of Gutenberg's 42–line bible of 1452–55, using modern Fraktur and decorative initial designed in METAFONT by Yannis Haralambous. The ability to control special characters like the insular (Tironian) ampersand (7) and unusual features like hanging punctuation makes LaTeX particularly well suited for typesetting critical and teaching editions. *(Beginning of St. John's Gospel.)*

Where to get LaTeX

- ❑ The TeX Users Group (TUG) distributes a free copy of the TeX Collection DVD to all members annually, with complete installations for all major platforms and a copy of the entire CTAN archive.
  Many local and national user groups also participate: check with your nearest group (see TUG Web site for addresses).
- ❑ You can buy a copy with business support from any of the vendors listed below.
- ❑ All the public-domain and open-source implementations are freely available for download from CTAN (below), including the DVD ISO image of the TeX Collection.

The TeX Users Group (TUG)

TUG membership is $85 a year (individual), $55 (students, new graduates, seniors, and citizens of countries with modest economies), $100 (non-voting, eg libraries), or $500 (institutional, up to eight named memberships). See `http://www.tug.org/forms` for details of 'early-bird' rates and other charges. Membership includes the triannual journal *TUGboat* and discounts on conference fees:

	TUG	EuroTeX/ConTeXt and others
2013	Tokyo, Japan	[tba]
2012	Boston, MA	Breskens, Netherlands
2011	Kerala, India	Bassenge, Belgium & Bachotek, Poland
2010	San Francisco, CA	Brejlov, Czech Republic
2009	South Bend, IN	Pisa, Italy
2008	Cork, Ireland	Bohinj, Slovenia & Pisa, Italy

CTAN — the Comprehensive TeX Archive Network

CTAN is an Internet archive of all free TeX and LaTeX software, packages, and documentation. There are searchable indexes and catalogues at `http://www.ctan.org`, `http://www.tex.ac.uk/`, and `http://www.dante.de`.

Online and other support

Network-based support is freely available on the `comp.text.tex` Usenet newsgroup, the `latexusersgroup@gmail.com` mailing list and the `tex.stackexchange.com` web forum. There are many others, including the TeX FAQ, listed at `www.tug.org/interest.html`.

Vendors with business support

Andrew Trevorrow	*OzTeX*	Mac	`http://www.trevorrow.com/oztex/`
MacKichan Software	*Scientific Word*	Win	`http://www.mackichan.com`
MicroPress, Inc	*Visual TeX*	Win	`http://www.micropress-inc.com`
PCTeX, Inc	*PCTeX*	Win	`http://www.pctex.com`
Tom Kiffe	*CMacTeX*	Mac	`http://www.kiffe.com`
TrueTeX, Inc	*TrueTeX*	Win	`http://truetex.com`

Technical Requirements

Operating systems

LaTeX runs on all current computing platforms. The most common implementations are:

System	Implementation
Microsoft Windows	*Free*: **TeX Live**, ProTeXt (MikTeX) *Commercial*: see vendor list
Unix and GNU/Linux	*Free*: **TeX Live**
Apple Macintosh OS X	*Free*: **MacTeX** (TeX Live) *Shareware*: OzTeX, CMacTeX
Android	TeX for Android in the Google Play store TeX Live for Android at Google Code
All others	*Contact the TeX Users Group*

Hardware

- ❑ LaTeX will run even on old machines, but a 500MHz processor or above is recommended.
- ❑ You should have at least 512Mb of memory, more if you aim to do very complex work or use very long documents.
- ❑ You need about 500Mb of hard disk space depending on the options you choose (minimal install is about 250Mb; full is about 1.2Gb).
- ❑ The finer your screen and printer resolution, the better quality you will be able to see and print. A fast inkjet printer or a laser printer is recommended if you need printed output.

Software for editing and reading documents

- ❑ You need a good text editor for creating and maintaining documents: there is a selection included on the TeX Collection DVD.
- ❑ You also need a PDF reader to view your typeset output (included on the TeX Collection DVD), eg *GhostScript/GSview*, *Okular*, Adobe *Acrobat Reader*, etc.
- ❑ You may need a graphics editor (eg *GIMP*) if you want to create or modify images (see *Figures*); and a vector editor (eg *InkScape*) if you use diagrams.