



**S** In principio erat verbū: 7 verbū erat apud deū: et de<sup>9</sup> erat verbū. Hoc erat in principio apud deū. Omnia p ipm facta sunt: 7 sine ipō factum est nichil. Quod factū est in ipō vita erat: 7 vita erat lux hominū: et lux in tenebris lu- cet. 7 tenebre eā nō comp̄henderūt. Fu-

Typographic resetting of Gutenberg's 42-line bible of 1452-55, using modern Fraktur and decorative initial in METAFONT by Yannis Haralambous. The ability to control special characters like the insular ampersand (7) and unusual features like hanging punctuation makes L<sup>A</sup>T<sub>E</sub>X particularly well suited for typesetting critical and teaching editions. (Beginning of St. John's Gospel.)

# L<sup>A</sup>T<sub>E</sub>X

Sophisticated professional typesetting for business and academic publishing

## Where to get L<sup>A</sup>T<sub>E</sub>X

- The T<sub>E</sub>X Users Group (TUG) distributes a free copy of the T<sub>E</sub>X Live CD-ROM and a free copy of the entire CTAN archive on CD-ROM to all members annually. Many local and national user groups also do something similar: check with your nearest group (see TUG Web site for addresses).
- All the public-domain and open-source implementations are available for free download from CTAN.
- You can buy a copy with commercial support from any of the vendors listed below.

## TUG

TUG membership for 2001 is \$65 a year for individuals, \$35 for students and OAPs, and \$75 for non-member subscriptions to publications only. See <http://www.tug.org> for details of discounts and other charges. Institutional rates for 2001 are \$500, which includes up to seven individual memberships. Membership includes the quarterly journal *TUGboat*, and discounts off conferences and training courses.

## CTAN

The Comprehensive T<sub>E</sub>X Archive Network is an online Internet archive of all T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X software. There is a searchable index and catalogue at <http://www.ctan.org>, <http://www.tex.ac.uk/>, <http://www.dante.de>, and <http://www.ucc.ie/cgi-bin/ctan>.

## Online and other support

Internet-based support uses the comp.text.tex Usenet newsgroup (available in German as de.comp.text.tex). There is also a two-monthly email newsletter, the *T<sub>E</sub>Xhax Digest*, and some extensive FAQs listed at <http://www.tug.org/tex-ptr-faq>.

TUG runs an annual conference (2001: Delaware) and the European local user groups run a EuroT<sub>E</sub>X conference (2001: Kerkrade)

## Vendors

Blue Sky, Inc	<i>Textures</i>	Mac	<a href="http://www.bluesky.com">http://www.bluesky.com</a>
K-Talk, Inc	<i>Converters</i>	—	<a href="http://www.ktalk.com">http://www.ktalk.com</a>
MacKichan Software	<i>Scientific Word</i>	Win	<a href="http://www.mackichan.com">http://www.mackichan.com</a>
MicroPress, Inc	<i>Visual T<sub>E</sub>X</i>	Win	<a href="http://www.micropress-inc.com">http://www.micropress-inc.com</a>
PCT <sub>E</sub> X, Inc	<i>PCT<sub>E</sub>X</i>	Win	<a href="http://www.pctex.com">http://www.pctex.com</a>
Radical Eye, Inc	<i>AmigaT<sub>E</sub>X</i>	Amiga	<a href="http://radicaleye.com">http://radicaleye.com</a>
TrueT <sub>E</sub> X, Inc	<i>TrueT<sub>E</sub>X</i>	Win	<a href="http://truotex.com">http://truotex.com</a>
Y&Y, Inc	<i>Y<sub>E</sub>Y<sub>T</sub>E<sub>X</sub></i>	Win	<a href="http://www.yandy.com">http://www.yandy.com</a>

## Technical Requirements

### Operating systems

L<sup>A</sup>T<sub>E</sub>X runs on all current computing platforms. The most common implementations are:

Operating System	Implementation
Microsoft Windows	<i>Free:</i> fpT <sub>E</sub> X, MikT <sub>E</sub> X, Lyx <i>Commercial:</i> see adjacent list
MS-DOS	<i>Free:</i> emT <sub>E</sub> X, sbT <sub>E</sub> X
Amiga	<i>Commercial:</i> AmigaT <sub>E</sub> X
Linux & other Unix	<i>Free:</i> teT <sub>E</sub> X, Lyx (RPMs available)
Apple Macintosh	<i>Shareware:</i> OZT <sub>E</sub> X <i>Commercial:</i> Textures
Mainframes and Supercomputers	<i>Contact the T<sub>E</sub>X Users Group for details (see alongside)</i>

### Hardware

- L<sup>A</sup>T<sub>E</sub>X will run even on quite old machines, but a 66MHz processor or above is recommended.
- You should have at least 32Mb of memory, more if you aim to do complex work or very long documents.
- You need approximately 300Mb of hard disk space depending on the implementation and the options you choose (a minimal installation takes about 75Mb; maximum is about 500Mb).
- A printer is needed if you want paper output, but L<sup>A</sup>T<sub>E</sub>X will generate PostScript™ and PDF™ files for sending to other people or to photo-imaging or laser typesetting equipment.

### Software

- You need an editor for maintaining your documents: there is a selection included on the T<sub>E</sub>X Live CD-ROM.
- A copy of GhostScript/GSview or similar is needed to view PostScript or PDF output (included on the T<sub>E</sub>X Live CD-ROM).
- A copy of the Acrobat Reader for PDF files can also be downloaded from [www.adobe.com](http://www.adobe.com).
- A graphics editor or manipulation program is needed if you want to create or modify images.

The ultimate in portable typesetting: L<sup>A</sup>T<sub>E</sub>X runs on any computer and produces timely, accurate, publication-quality output on desktop printers and commercial typesetters.

It's completely free, and has been the tried and tested solution for over 20 years. L<sup>A</sup>T<sub>E</sub>X is in use by leading publishers, documentation specialists, and technical and academic users worldwide.

## What they say about L<sup>A</sup>T<sub>E</sub>X

I was getting increasingly exasperated with the limitations presented by wordprocessing programs when L<sup>A</sup>T<sub>E</sub>X 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, Roinn na Sean & Meán Ghaeilge*

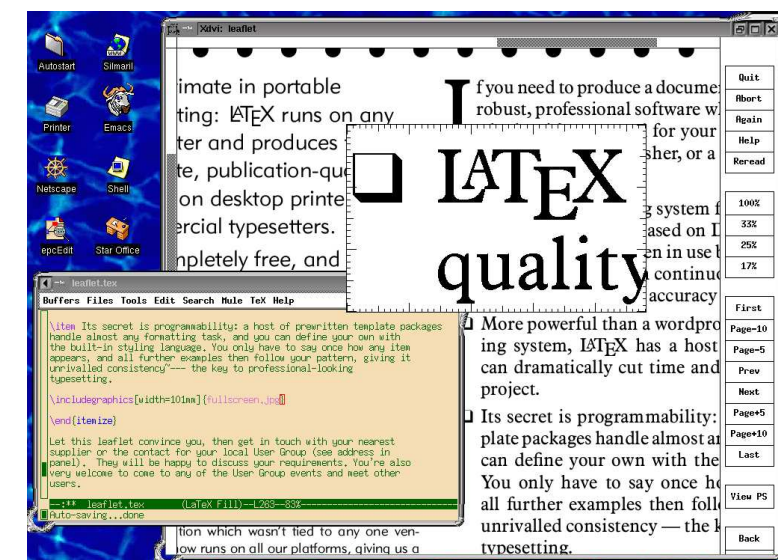
I use pdfL<sup>A</sup>T<sub>E</sub>X and METAFONT not only because I need them to create my presentations, lecture notes and papers but also because it's fun! Entering a math equation in Powerpoint is a pain in the neck: with pdfL<sup>A</sup>T<sub>E</sub>X and METApost it is a lot easier because you 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 Science*

L<sup>A</sup>T<sub>E</sub>X is available in UCC from the Electronic Publishing Unit Computer Centre 4th Floor, Kane Building (email [e1ecpub@ucc.ie](mailto:e1ecpub@ucc.ie))  
The Irish T<sub>E</sub>X And L<sup>A</sup>T<sub>E</sub>X Interest Community is at <http://listserv.heanet.ie/italic-1.html>

If you need to produce a document for publication you need robust, professional software which won't let you down — whether it's a manual for your customers, an article for a journal, a book for a publisher, or a newsletter for your club or society.

- L<sup>A</sup>T<sub>E</sub>X is a typesetting system for the production of high-quality documents, based on Don Knuth's revolutionary T<sub>E</sub>X program. It's been in use by millions since its launch in 1978, 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, L<sup>A</sup>T<sub>E</sub>X has a host of unique features which can dramatically cut time and cost from any publishing project.
- Its secret is programmability: a host of prewritten template packages handle almost any formatting task, and you can define your own with the built-in styling language. You only have to say once how any item appears, and all further examples then follow your pattern, giving it unrivalled consistency — the key to professional-looking typesetting.



Let this leaflet convince you, then get in touch with your nearest supplier or the contact for your local User Group (see address 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 L<sup>A</sup>T<sub>E</sub>X

Could your next article, book, paper, report, review, or essay benefit from using L<sup>A</sup>T<sub>E</sub>X? Do you need to be able to exchange reliable documents with colleagues working on other types of computer?

- Default styles give you immediate, automatic formatting for common types of document.
- Powerful automation features handle cross-references, bibliographic citations, tables of contents, and indexes with ease.
- Automated formatting of formulae, designed by one of the world's leading mathematicians.
- Produces PostScript™ and Acrobat™ (PDF) files.
- Available in free and commercial versions (public domain/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.
- Completely portable between systems — document files are all plaintext (ASCII) and can be edited and processed on any platform, even over a network.

'I find L<sup>A</sup>T<sub>E</sub>X 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. L<sup>A</sup>T<sub>E</sub>X is demanding in its requirements but it relieves me of any concern about the finished project.'

Séamus Ó Direáin, *Roinn na Nua Ghaeilge*



## Fonts

Whether you're using Windows, Mac, or Unix, L<sup>A</sup>T<sub>E</sub>X works with any METAFONT or PostScript Type 1 font. When creating PDF documents, you can also use TrueType fonts. This gives you access to thousands of typefaces, both free and commercial.

The standard Adobe '36' PostScript fonts including Palatino, Century Schoolbook, Zapf Calligraphic etc. can be used even without a PostScript printer, thanks to the GhostScript/GSview program (on the T<sub>E</sub>X Live CD-ROM) which prints PostScript output on any printer.

The typographic work of the T<sub>E</sub>X setting engine is very precise: it works internally in units too small to see, resulting in great precision in measurement. L<sup>A</sup>T<sub>E</sub>X can use Anglo-American, Didot, or Adobe points, or metric or imperial units, or any mixture.

In addition, L<sup>A</sup>T<sub>E</sub>X comes with a collection of specialist faces for technical, linguistic, and literary typesetting (see adjoining sampler), and also the comprehensive mathematics fonts of Computer Modern, Euler, and Concrete (Times Math is available for a small fee from Y&Y, Inc).

L<sup>A</sup>T<sub>E</sub>X can also set Japanese, Chinese, Devanagari, Urdu, Thai, Vietnamese, Coptic, Greek, and many other languages and alphabets, including bi-directional Arabic and Hebrew.

The fontmaking program METAFONT is a companion to all T<sub>E</sub>X systems and can be used to design and implement your own typefaces or special symbols.

## Mathematics

T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X are the only systems capable of automated mathematical formatting. Expressions are entered in symbolic form, regardless of complexity, and automatically spaced and sized according to mathematicians' standards:

$$E(n_{g+1} | n_i, n_i'; 1 \leq i \leq g) = (N' - N'_g) \left[ 1 - \left\{ \left( 1 - \frac{c}{cN' + N''} \right)^{n'_g d} \left( 1 - \frac{c}{cN'' + N'} \right)^{n''_g d} \right\} \right]$$

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

## Tabular matter, figures, and other notations

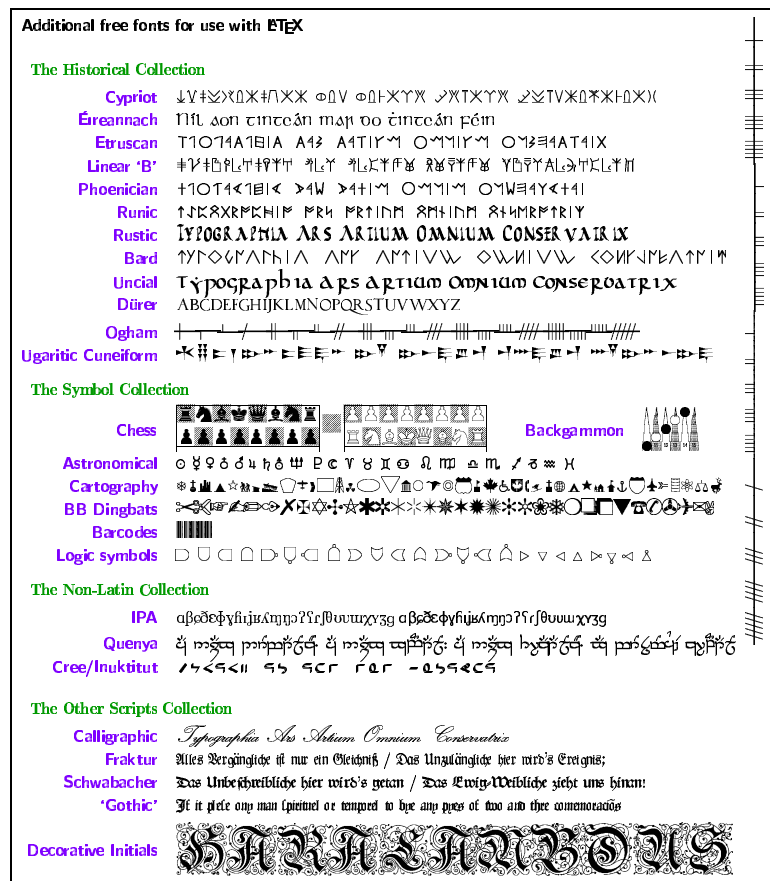
L<sup>A</sup>T<sub>E</sub>X's tables and figures follow standard publishers' practice of 'floating', so if there is no room on the current page, they automatically move to the next. The automated crossreferencing system means that tables and figures can be moved around the document and will always renumber 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 L/R/C and on a decimal point, or formatted as paragraphs. The inter-row gap can be very precisely aligned to provide better visual spacing.

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

$\sigma$	Method of quantiles		Kemsley's method		Total no. of samples available
	5%	10%	5%	10%	
0.2-0.4	—	—	—	—	20
0.5-0.7	—	—	—	—	22
0.8-1.0	—	1	2	15	23
All samples	2	2	4	23	65

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



## Persistence and reliability

L<sup>A</sup>T<sub>E</sub>X was designed to be independent of any particular manufacturer, make, or model of computer or printer. Unlike some wordprocessor manufacturers' proprietary file formats, L<sup>A</sup>T<sub>E</sub>X uses a plaintext (ASCII) format which can be created and updated with any editor, and moved between disparate systems without danger of information loss or corruption.

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

L<sup>A</sup>T<sub>E</sub>X material originally produced purely for paper printing, no matter how long ago, can quickly and easily be made available for the Web access desired today. I have just recently had to provide all the files for a journal from 1987-1996 in a format available for the Web. The early L<sup>A</sup>T<sub>E</sub>X files were re-run and converted into PDF files. The opening page was converted into HTML for quick scanning on the Web, while the complete article, with all typesetting and font features (including Hebrew, phonetics, and Greek), was available for viewing.

The biggest advantage in publishing production is that the similar coding of all files means anyone can do any journal — there is no need to learn a whole new set of commands to address style variations. Changes in platforms have no effect on production as T<sub>E</sub>X 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, Carleton*

## Documentation

- [1] Michel Goossens, Frank Mittelbach, and Alexander Samarin. *The L<sup>A</sup>T<sub>E</sub>X Companion*. Addison-Wesley, Reading, MA, 1st edition, 1994.
- [2] Donald Knuth. *The T<sub>E</sub>Xbook*. Addison-Wesley, Reading, MA, 1986.
- [3] Leslie Lamport. *L<sup>A</sup>T<sub>E</sub>X, a document preparation system*. Addison-Wesley, Reading, MA, 2nd edition, 1994.

The book by Lamport is the user manual for L<sup>A</sup>T<sub>E</sub>X: make sure you get the second edition for L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>. The *Companion* is more advanced, but useful if you want to implement highly customised document designs. Knuth's original *T<sub>E</sub>Xbook* is of interest to typographic programmers who need to know the finest detail.

There are dozens of other books, ranging from the on-line introduction, *The (not so) short introduction to L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>*, and many books for beginners, to the professional mathematician's *The Joy of T<sub>E</sub>X* and the typographer's *Digital Typography*.

Formal tables are automatically numbered, and can be captioned, labelled, crossreferenced, and added to a List of Tables at the front of the document. The tabular matter within them can span pages and can be printed landscape (sideways) while retaining the portrait (upright) orientation of the caption and pagenumbers.

Simple tabular matter can appear anywhere, and stays where it is put (does not float like a formal table).

Figures can contain textual or graphical illustrations. Pictures can be included with scaling, rotation, and clipping: normal L<sup>A</sup>T<sub>E</sub>X uses the industry standard Encapsulated PostScript format, while pdfL<sup>A</sup>T<sub>E</sub>X uses JPG, PNG, or PDF graphics. The *ImageMagick* graphics manipulation package is included on the T<sub>E</sub>X Live CD-ROM.

L<sup>A</sup>T<sub>E</sub>X also has a simple CAD-like vector language for rendering diagrams, and special facilities for typesetting musical notation, electronic circuit diagrams, flowcharts, and other graphical notations.

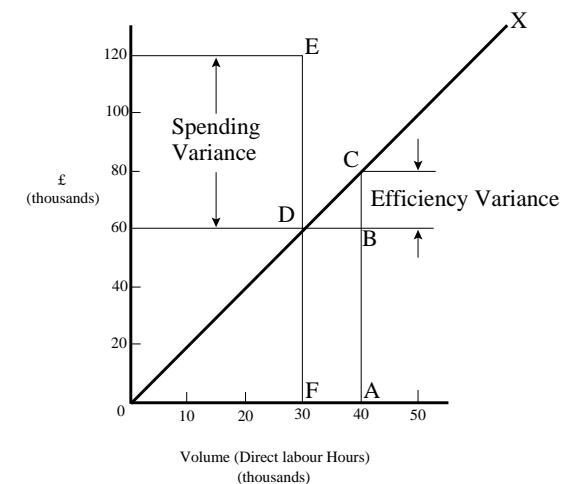
## Crossreferences

The crossreferencing feature lets you give a name to each object you want to refer to (table, figure, section, chapter, page, list item...), and then use 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 principle applies to the automated indexing, glossary, table of contents, list of figures, list of tables, and bibliographic references.

The BIB<sub>T</sub>E<sub>X</sub> bibliographic database lets you keep all your references separately from your documents, but have them extracted and automatically formatted to any of the standard styles, using numeric, in-text, footnote, or endnote methods.



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