

# Powerful, stable, XML-friendly: discover (La)T<sub>E</sub>X



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## Discover (La)T<sub>E</sub>X



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Las Vegas  
Tue 9 May 2006

## (La)T<sub>E</sub>X is worth the investment ...

**For consistent typesetting**  
*across large documents—or collections*

**For constrained designs**  
*with trial-and-error possibilities*

**For single sourcing**  
*one input / several outputs*

## Discover (La)T<sub>E</sub>X



**T<sub>E</sub>X basics**  
*The name of the game*

**T<sub>E</sub>X's strengths**  
*Three reasons to adopt it*

**T<sub>E</sub>X's possibilities**  
*The sky is the limit*



# T<sub>E</sub>X basics

*The name of the game*

T<sub>E</sub>X is a typesetting language

- It is platform-independent  
*designed with portability in mind*
- It is well defined  
*and well documented*
- It is in the public domain  
*though environments may not be*

T<sub>E</sub>X is a **mark-up** language

Source file (ASCII) → Typeset → Typeset pages (DVI)

T<sub>E</sub>X is a **programming** language

Source file (ASCII)

- Define how a section heading should look, be numbered, ...  
`\def\section#1{...}`
- Identify a section heading as such  
`\section{Installing the software}`

T<sub>E</sub>X is a programming language

Source file (ASCII)

- Variables (storage)  
for counters, dimensions, ...
- Fixed-point arithmetic  
so you can add, multiply, ...
- If-then-else constructs  
and other controls, such as loops

Hello, world.

Hello, `{\it world}`.

`\def\x{Hello}`  
`\x, world.`

`\leftskip = 0.5in`  
Hello, world.

`$ {-1+\sqrt{5} \over 2}`  
`\approx 0.618 $`

Hello, world.

$\frac{-1 + \sqrt{5}}{2} \approx 0.618$

L<sup>A</sup>T<sub>E</sub>X is a package of T<sub>E</sub>X macros

- L<sup>A</sup>T<sub>E</sub>X encourages structured writing  
*separating content markup from formatting*
- L<sup>A</sup>T<sub>E</sub>X creates so-called environments  
*with \begin ... \end constructs (not unlike HTML)*
- L<sup>A</sup>T<sub>E</sub>X automatizes certain tasks  
*such as cross-references and tables of contents*

`\figure{The widget's components ... \label{figwidget}}.`

...

... to take the widget apart (Figure `\ref{figwidget}`).

**Figure 4.3** The widget's components ...

...

... to take the widget apart (Figure 4.3).

# T<sub>E</sub>X's strengths

## Three reasons to adopt it

### Reason #1

#### T<sub>E</sub>X produces beautiful pages

In each of these examples, the bracketed expression is the relevant binding domain – the deepest TP or possessive DP containing *sig*. Based on this data, *sig* has the same distribution as *ham*. Sentences b through e are exactly the same as the corresponding sentences above (except that *ham* has been changed to *sig*), and they correspond in grammaticality. The ungrammaticality of (3a) can be explained by the fact that *sig* is bound by *Susan* within the deepest TP containing it, namely the entire sentence itself (see Figure 5).

Figure 5. Partial structure of (3a).

On the other hand, we see the following contrasts between *sig* and *ham*:

- (f) a. Michael<sub>i</sub> understrig<sub>j</sub> ham<sub>k</sub>.
- b. \*Michael<sub>i</sub> understrig<sub>j</sub> sig<sub>k</sub>.
- c. Michael<sub>i</sub> had Peter<sub>j</sub> [PRO]<sub>k</sub> drive till ham<sub>k</sub>.
- d. \*Michael<sub>i</sub> had Peter<sub>j</sub> [PRO]<sub>k</sub> drive till sig<sub>k</sub>.

#### T<sub>E</sub>X makes it relatively simple to typeset the most complex mathematical formulas

The transverse, forward-propagating eigenmodes  $\tilde{u}_{p\ell}(r, \phi)$  of Huygens' complex integral equation in cylindrical coordinates are the complex Laguerre-gaussian modes, defined as

$$\tilde{u}_{p\ell}(r, \phi) = \tilde{a}_{p\ell} \left( \frac{\sqrt{2}}{\tilde{v}} r \right)^{|\ell|} L_p^\ell \left( \frac{2}{\tilde{v}^2} r^2 \right) \exp \left\{ -\frac{j\pi}{\lambda \tilde{q}} r^2 + j\ell\phi \right\},$$

with  $L_p^\ell(z)$  the complex generalized Laguerre polynomial, and the parameters  $\tilde{v}$  and  $\tilde{q}$  defined as in cartesian coordinates.

#### T<sub>E</sub>X understands fine typographical points, such as kerning, ligatures, and diacriticals

I met Tülay Adah. She is a faculty at UMBC.

Space is larger

I met Tülay Adah. She is a faculty at UMBC.

I met Tülay Adah. She is a faculty at UMBC.

I met Tülay Adah. She is a faculty at UMBC.

Space stretches more

#### T<sub>E</sub>X uses a unique algorithm to optimize the line breaks

**Word** STC is an individual membership organization dedicated to advancing the arts and sciences of technical communication. It is the largest organization of its type in the world. Its 18 000 members include technical writers and editors, content developers, documentation specialists, technical illustrators, instructional designers, academics, information architects, usability and human factors professionals, visual designers, Web designers and developers, and translators—anyone whose work makes technical information available to those who need it.

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### Reason #2

#### T<sub>E</sub>X is reliable

T<sub>E</sub>X is well defined and documented  
*and the order of operations is predictable*

T<sub>E</sub>X has not changed since 1989  
*and operates with no known bugs*

T<sub>E</sub>X uses plain text as a source file  
*and will not change the file behind your back*

### Reason #3

#### T<sub>E</sub>X does (almost) anything I ask it

T<sub>E</sub>X allows fine, reliable control  
*unlike direct-manipulation applications*

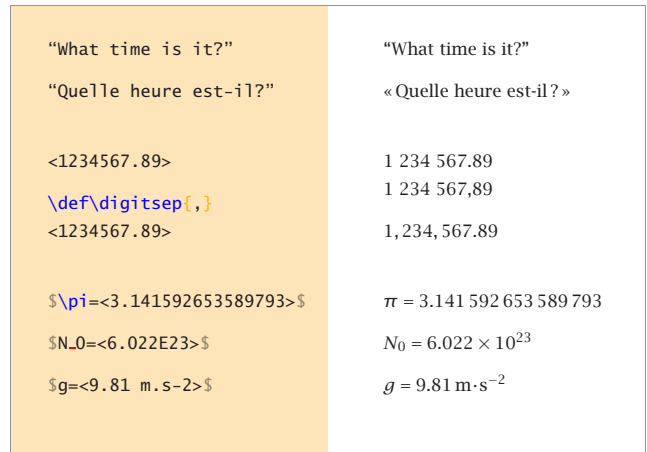
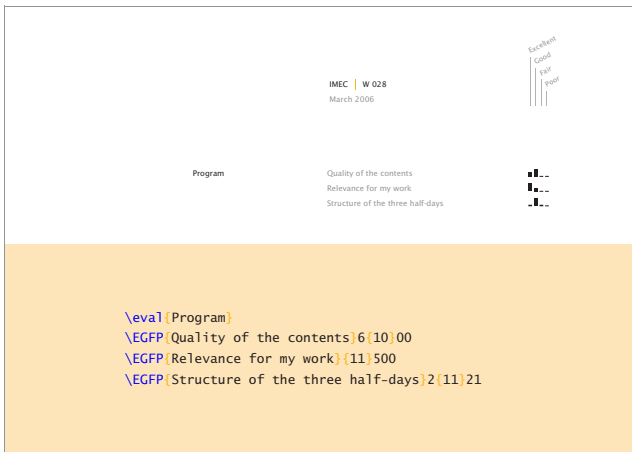
Plain text files are versatile  
*They are easy to generate and to edit*

T<sub>E</sub>X itself can be expanded  
*for example with PostScript code*

# TeX's possibilities

## The sky is the limit

Not all examples shown in the presentation could be included here, because of confidentiality issues.



Inappropriate subject

4 IBM invented CMP in the late 80's to allow for more metal layers in the integrated circuits (IC) that they produced. Originally it was called Chemical Mechanical Planarization (CMP) since that was the purpose for which it was created. A typical transistor wiring process flow of the time is shown.

5 Due to the diversity of these impairments, it is very difficult to take them as such into account.

Main information in subordinate clause

6 It should be noted here that since they are based on zero charge assumption, their correctness should be questioned.

7 As for the value of the maximum generated power we observe that it is close to the one predicted by Fig. 1, ...

8 In conclusion, it can be said that the reduction of the  $\mu\text{m}$  error to below 5 nm will be very difficult if ...

9 Moreover we can see that configuration s1, which exhibits ..., outperforms s1 except for  $E_s/N_0$  between 3 dB and 4 dB ...

