

**Zpravodaj 2023/1–2**

*Zpravodaj* is the journal of  $\mathcal{C}\mathcal{S}\text{TUG}$ , the  $\text{T}\mathcal{E}\mathcal{X}$  user group oriented mainly but not entirely to the Czech and Slovak languages. The full issue can be downloaded at `csstug.cz/bulletin`.

PETR SOJKA, Úvodník [Introductory word]; pp. 1–3

Go forth and participate in  $\mathcal{C}\mathcal{S}\text{TUG}$  to make the bright future of  $\text{T}\mathcal{E}\mathcal{X}$  & Friends a reality! *You can!*

VÍT STARÝ NOVOTNÝ, Nápadovník jmen pro tvůrčí psaní v  $\text{Lua}\mathcal{T}\mathcal{E}\mathcal{X}$ u [Character name generator for creative writing in  $\text{Lua}\mathcal{T}\mathcal{E}\mathcal{X}$ ]; pp. 3–38

A famous dictum of the computer scientist Phil Karlton says that there are only two difficult things in computer science: cache invalidation and naming things. This is also true in creative writing, where authors have to come up not just with a story and a setting but also the names of all their fictional characters. In this article, we develop a language model in  $\text{Lua}\mathcal{T}\mathcal{E}\mathcal{X}$  which allows authors to automatically generate names for their characters. Besides creative writing, we also discuss other uses of language models in  $\text{Lua}\mathcal{T}\mathcal{E}\mathcal{X}$ , namely the automatic switching of hyphenation patterns based on the current language and blind text generation. For the  $\text{T}\mathcal{E}\mathcal{X}$ nically-minded users, the article acts as an introduction to the programming languages of Lua and *expl3*, and also the *xparse*  $\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$  package for defining document commands in  $\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$ .

KAREL ŠEBELA, Sazba hudebních skladeb [Musical composition typesetting]; pp. 39–47

$\text{T}\mathcal{E}\mathcal{X}$  is a useful tool for text typesetting; however, it doesn't feature good support for music composition typesetting at its core. The TUG 2022 conference featured a talk on notation typesetting which compared the *MusiX $\mathcal{T}\mathcal{E}\mathcal{X}$*  package with the *MuseScore* and *Flat* tools, but did not mention the *PMX* and *M-Tx* preprocessors. In this article, I compare typesetting using *MusiX $\mathcal{T}\mathcal{E}\mathcal{X}$*  and its preprocessors and describe its usage. In addition, I describe the incorporation of note symbols into a paragraph text. After reading the article, the reader will be able to create a short simple excerpt of a piece of music and incorporate it into a  $\text{T}\mathcal{E}\mathcal{X}$  document, as well as add musical symbols to a written text.

MATÚŠ VANČÍK, Pohľad  $\text{T}\mathcal{E}\mathcal{X}$ ového nováčka na prezentáciu „Bricks and Jigsaw Pieces“ z TUGu 2022 [A  $\text{T}\mathcal{E}\mathcal{X}$  newbie reports on the “Bricks and Jigsaw Pieces” talk at TUG 2022]; pp. 48–53

The article deals with *TikZbricks* and *jigsaw* packages: their use, design, and possible applications. I look at these aspects of the packages through my own experimentation as a newish  $\text{T}\mathcal{E}\mathcal{X}$  user and I show why such packages are needed in the world of  $\text{T}\mathcal{E}\mathcal{X}$ .

PETER WILSON, Mělo by to fungovat XIII [It might work XIII]; pp. 54–60

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[Received from Vít Novotný.]

**The gods smile at me: *The  $\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$  Companion*, third edition, and ChatGPT**

George Grätzer

**1 Contemplation**

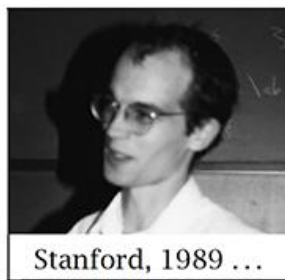
The fifth edition of my *Math into  $\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$*  book is still selling well, but it is seven years old (LIT). A lot has changed. All  $\text{T}\mathcal{E}\mathcal{X}$  files,  $\text{BIB}\mathcal{T}\mathcal{E}\mathcal{X}$  and  $\text{MakeIndex}$  files changed from ASCII to UTF-8. Lots of work has been done for references, further developing and enhancing  $\text{BIB}\mathcal{T}\mathcal{E}\mathcal{X}$ . And a lot more . . .

So I started contemplating a sixth edition, a huge undertaking. For instance, the  $\text{BIB}\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$  manual alone is about 350 pages and I would have to read at least ten like that.

And then the gods smiled at me . . .

First smile: *The  $\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$  Companion*, third edition.

Second smile: ChatGPT.

**2 The  $\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$  Companion, third edition**

This is a heavy contribution by Frank Mittelbach (mostly); the two volumes weigh 3.5 Kg and they run to almost 1,800 pages. I complained how much I would have to read for my sixth edition, multiply that

by ten, twenty, or more for this. Frank is a voracious reader with an immense knowledge of  $\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$ . The book discusses about 500 packages.

It caters to two audiences, the general user, GU (they use  $\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$  for their work but cannot read  $\text{T}\mathcal{E}\mathcal{X}$  code, like me) and the 1% (they read  $\text{T}\mathcal{E}\mathcal{X}$  code and design style files and create packages).

It is hard to tell whether the 1% is 1% of  $\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$  users. CTAN has currently about 6,500 packages and 3,000 contributors. We have no hard numbers on the number of research mathematicians who use  $\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$  or the number of computer scientists, physicists, chemists, and so on, who also use it. So I will use 1% as a label, not quantified.

The needs of the GU and the 1% are very different. I wrote over 270 research papers, all for mathematical journals, style files supplied by the journals and 31 books, all with custom style files written by the 1%.

Now the content, it starts with Chapter 2, “The Structure of a  $\LaTeX$  Document”. The first few sections are for the GU, each veering off into topics for the 1%. At least one section, “Splitting the source document into several files”, was made obsolete by the increasing speed of computers. When I started  $\TeX$ ing, it took more than two minutes to typeset a page. Now the whole sixth edition typesets in less than 3 seconds. So the section on how to use the  $\LaTeX$  commands `\include` and `\includeonly` is much more esoteric.

There is little in the 130 pages of Chapter 3, “Basic Formatting Tools—Paragraph Level”, for the GU. It does mention `xspace` and `microtype`, so important.

Chapter 4 is “Basic Formatting Tools—Larger Structures”. Another 100 pages that does not have much for the GU. It does discuss modifying the list environments; not many users like how they are spaced.

Chapter 5, “The Layout of the Page”, is full of useful information for the 1%.

Chapter 6, “Tabular Material”, helps the reader to publish nicer-looking tables, the  $\LaTeX$  default is rather ugly. It mentions the `booktabs` package I use for all my tables in my  $\LaTeX$  books.

Chapter 7, “Mastering Floats”, addresses every  $\LaTeX$  user’s huge problem: the figures and illustrations act up, they are not inserted into the document well. It suggests the use of the `\clearpage` command. In the sixth edition, I recommend trying to combine two or three floats into one.

“Graphics Generation and Manipulation” is discussed in Chapter 8, including the very important `graphicx` package of David Carlisle.

Maybe one of the most illuminating parts is Chapter 9, “Font Selection and Encodings”. Everybody can benefit from reading the first five sections, a detailed introduction to the New Font Selection Scheme (NFSS) of Frank Mittelbach and Rainer Schöpf, which revolutionized  $\LaTeX$ .

This completes Volume 1, and we start the second volume with Chapter 10, “Text and Symbol Fonts”. It is continued in Chapter 12, “Fonts in Formulas”. I am not sure for whom these chapters are meant. They must have been hard to compile, but who will benefit? The exception is the Lucida font, in which the book is typeset. Almost 200 pages of font samples seems a little excessive.

Chapter 11, “Higher Mathematics”, is compulsory reading for all mathematicians. Also for all scientists using formulas. Maybe, “Typesetting Formulas” would have been a better title. College math does not utilize formulas?

Chapter 13, “Localizing Documents”, is also compulsory reading for all  $\LaTeX$  users who want to write in a language other than English. There is support for 30 languages, French and German are the best.



Chapter 14 discusses “Index Generation” for books and long documents utilizing `MakeIndex`. All book authors should read it.

Chapters 15, “Bibliography Generation” and 16, “Managing Citations” are also must-reads for book authors. The first focuses on `BIB $\TeX$`  and the highlight of the second is the section on `BIB $\LaTeX$` , a 45 page summary of a 350 page user manual.

Chapter 17, “ $\LaTeX$  Package Documentation Tools”, Appendixes A, “ $\LaTeX$  Overview for Preamble, Package, and Class Writers” and B, “Tracing and Resolving Problems” are, of course for the 1%.

This book is a *tour de force* by Frank Mittelbach, seven years of intense work. I am not sure that “the Companion would serve as the only reference needed to get ‘the job’ done.” But for sure, no  $\LaTeX$  user should be without it.

A minor complaint: The Contents is almost 20 pages long, hard to navigate. Maybe a Short Contents would have been helpful.

### 3 ChatGPT

For a few months now, I have been writing the sixth edition of my book, with a new title, *Text and Math into  $\LaTeX$* . Every day I consult ChatGPT dozens of times. I mostly converse about  $\LaTeX$  topics but I also check English usage often (and love to write Hungarian poems in the poet Petőfy’s style.)



ChatGPT got a bad rep. Version 3.5 used its pattern recognition and completion abilities to generate references and links, with unfortunate results. I use Version 4.0 which does not have this problem, nor do I ask

anything where such a problem would arise.

In the first three editions of my book, I distinguish between L<sup>A</sup>T<sub>E</sub>X commands and AMS math commands. I changed that in the fourth edition, to simplify the discussion. So the phrase: “L<sup>A</sup>T<sub>E</sub>X does not provide tools to access bold lowercase Greek letters”, changed its meaning from the third to the fourth edition. Is it still true?

So I ask ChatGPT. It responds: use the `\bm` command provided by the `bm` package.

I want to refresh my understanding of the command `\fontencoding`. I ask ChatGPT:

### latex `\fontencoding` command, use and examples

The reply:

As of my last training cut-off in September 2021, in LaTeX, the `\fontencoding` command is used to specify the font encoding scheme. Different font encodings contain different sets of characters. By using a specific encoding, you can access the set of characters that it defines.

For example, the OT1 encoding is the default in LaTeX, and it does not support accented characters. If you use an accented character, then LaTeX will build it by combining the unaccented character and a separate accent character. But this can cause problems in some situations, like hyphenation.

The T1 encoding, which is part of the Cork encoding scheme, supports accented characters directly. It’s often recommended to use T1 for European languages, because it improves the hyphenation of words with accented characters.

Here’s an example:

latex

```
\documentclass{article}
\usepackage[T1]{fontenc}

\begin{document}
Grüße aus Köln!
\end{document}
```

In this example, the `\usepackage[T1]{fontenc}` line loads the T1 font encoding. The words in the document are German and include accented characters. The T1 encoding allows LaTeX to handle these characters properly.

It’s worth mentioning that using `\usepackage[T1]{fontenc}` changes the font encoding for the entire document. If you want to change the encoding for a specific part of the document only, you can use the `\fontencoding` command together with `\selectfont`, like this:

latex

```
\documentclass{article}

\begin{document}
\fontencoding{T1}\selectfont
Grüße aus Köln!
\fontencoding{OT1}\selectfont
Back to the default encoding.
\end{document}
```

In this example, the T1 encoding is used only for the German text, and then the encoding is changed back to OT1 for the rest of the document. Note that `\fontencoding` doesn’t change the font immediately. It only changes the encoding that LaTeX will use the next time it selects a font, which is why `\selectfont` is needed.

And if you want more related information, ask: **And how about XeLaTeX and LuaTeX**

ChatGPT keeps track of all your conversations, so I have hundreds more to share. I trust these two are enough to convince you to try it for yourself.

- ◇ George Grätzer  
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