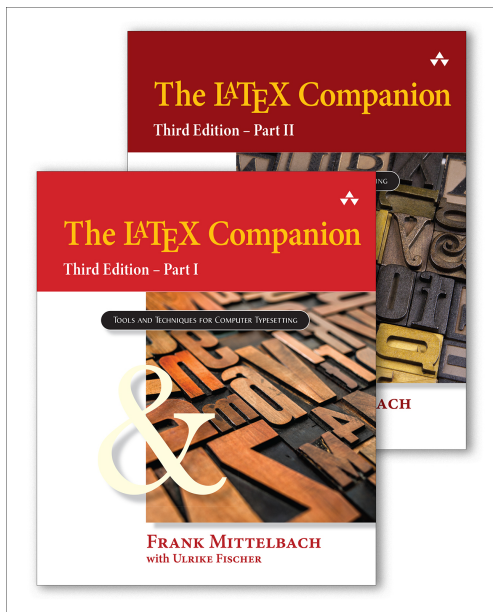


Notes on producing TLC3

Frank Mittelbach

Bonn, July 2023

The finished product



The first review — A monumental pair of books

★★★★★ **Worth More than 5 Stars. A monumental pair of books.**

Kundenrezension aus den USA 🇺🇸 am 21. Mai 2023

Verifizierter Kauf

Honestly, I had started to think that Frank Mittlebach was slacking off due to all the delays, but I finally received the two volumes today. Now I realize why it took so long. These two books are truly monumental in size and scope. The content is incredibly well-written. If you're someone who uses LaTeX, you'll thoroughly enjoy these books. And if you're new to LaTeX, I recommend getting familiar with it first, and then these books will be a fantastic addition to your collection. They're absolutely remarkable. And so are Frank & Ulrike.



- ▶ Number of pages in the print version
 - ▶ Part I = 976 ($= 16 \times 61$)
 - ▶ Part II = 1008 ($= 16 \times 63$)
 - ▶ total = George Orwell
- ▶ Number of pages in the digital version = 1812
 - ▶ Slightly less, because there is only one index, a combined bibliography, and a shortened front matter
- ▶ Number of \LaTeX packages
 - ▶ reviewed ≈ 5000
 - ▶ covered ≈ 500 (10%)
- ▶ Number of examples = 1544



Why did it take 5 years?

First phase: research (≈ 1 year)

- ▶ work through 5000 packages on CTAN
- ▶ classify them according to functionality, usability, and correctness

Second phase: describe (≈ 3 years)

- ▶ develop useful examples
- ▶ discuss with authors, resolve issues, . . .
- ▶ describe the packages

Third phase: produce (≈ 1 year)

- ▶ enter copy-edits, enter concept index data
- ▶ produce pagination (**after copy-editing!**)
- ▶ enter proof corrections



Packages used in the book preparation

General observations

- ▶ In total more than 140 packages are used as part of the main \LaTeX run
 - All packages (500+) described in the book are used in examples (but those are run separately)
- ▶ Chapter 10 displays more than 100 font families, most of them inline and not as external examples
 - With so many fonts used, the default \TeX Live settings for font memory blew up
- ▶ `hyperref`, `bookmark`
 - for interactive PDF features in the digital versions



Packages used in the book preparation

In the main text

- ▶ `acro`
 - not usable in combination with `\includeonly`
 - or only if you restart counting on a per chapter basis
- ▶ `csquotes`
 - to handle quote symbols properly
- ▶ `varioref`
 - a necessity, if you have to do complex pagination adjustments
 - of course, you end up with a few “impossible documents”
- ▶ `microtype`
 - provide proper hanging punctuation
 - allow for light font expansion and compression
 - Lucida fonts are not supported out of the box



Packages used in the book preparation

Bigger structures

- ▶ chapter headings, lists — done with basic \LaTeX constructs
- ▶ `titletoc`
 - for partial table of contents
- ▶ `array`, `tabularx`, `booktabs`
 - for tables, in a few cases also `longtable` or `multicol`
- ▶ `graphicx`, `overpic`
 - for figures
- ▶ `caption`
 - for float captions, no other float package necessary
- ▶ `tcolorbox`
 - for the information boxes



Packages used in the book preparation

Pagination and back matter

- ▶ page layout — done with basic \LaTeX constructs
- ▶ fancyhdr
 - for running headers and footers
- ▶ Indexes
 - MakeIndex, but with a lot of pre-post processing
 - multicol
 - many symbol font packages; **some symbols faked**
- ▶ Bibliography
 - Bib \TeX with a style produced by custom-bib
 - natbib for citation commands
 - bibunits

to have separate bibliographies per part, while running both parts in a single \LaTeX run



Packages used in the book preparation

Examples

- ▶ `fancyvrb`
 - to extract and generate the example source files
- ▶ Examples are then run externally
 - involving `biber/BibTeX` and `LATEX` packages, as necessary
- ▶ `pdfseparate`
 - to split the result PDFs into individual pages
- ▶ `pdfcrop`, `graphicx`
 - to cut them to size and load the final PDF



Support packages used during book production

- ▶ `morewrites`
 - **essential** if the other packages open too many write streams
- ▶ `xcolor, colorspace`
 - for producing spot colors — **a difficult undertaking**
- ▶ `todonotes, bookmark`
 - for tracking open tasks during the book writing
 - for each note we added a book mark, to easily find them again
- ▶ `structuredlog`
 - to err is human — this helped to find them in the source



Support packages used during book production (cont.)

- ▶ `lineno`
 - used during production to communicate with the indexer
- ▶ `widows-and-orphans`
 - used during pagination and as a guard against unexpected changes

Source control

- ▶ Previous edition used SVN, now we used Git
- ▶ `mkjobtexmf`
 - collect all files used during processing and store them in a separate tree under source control
- ▶ `gitinfo2`
 - to record the current branch (outside the printed area)



The final production workflow

- ▶ To prepare the book it needs 7 compilations of the whole book
 - Don't use `\includeonly` at that stage
 - On my iMac with M1 chip that takes roughly 30 minutes
- ▶ The first run generates all the example sources
- ▶ Then all examples are processed — many need two runs
 - The generation of all 1540 examples takes another 2.5 hours
- ▶ The bibliography needs to be generated several times
 - because entries might add further entries (which might add further entries)

Extremely important:

You need a lot of automated checks to ensure correct final results!



Lessons learned across all three editions

- ▶ Always make use of what you describe
 - not done in first edition
- ▶ Do not work on pagination before all of the text is finalized
 - not done (well) in third edition
- ▶ Keep all layout code as separate as possible
 - started in second edition
- ▶ Guard against and test for pagination changes due to package or code updates
 - started in second edition, extended in third
- ▶ Automate testing for errors/issues as much as possible
 - started in second edition, extended in third



On adjustments for pagination

Some statistics

- ▶ 24 long spreads
- ▶ 41 short spreads
- ▶ 51 compressed pages (using `\enlargethispage*`)
- ▶ 501 forced page breaks (30% of all text pages)

- ▶ 125 shortened paragraphs (using `\looseness=-1`)
- ▶ 17 lengthened paragraphs (using `\looseness=1`)
- ▶ \approx 1200 adjustments of vertical spacing
- ▶ \approx 400 example adjustments (25%) to alter the size
- ▶ \approx 100 other adjustments (text rewrites)

A big help during that phase: the `widows-and-orphans` package



Manipulating the double spreads from the outside

- ▶ For each chapter I have a file indicating whether pages should be run l (long), s (short), f (forced), or = (normal).
- ▶ For example, for chapter 1:

```
=          1
l
l
=
=          5
=
=
=
l
l          11
l
l
=
=
=
=
=          18
=          19
```



Recording the pagination

```
1: ... reading from chapters/ch-intro.in
1: <--- normal page
1: ==== shipout ==== (35) BADNESS 143 (missing: -4.82408pt page: 12.30002pt minus 8.0pt footnote: 4.0pt minus 2.0pt)

2: <--- long page
2: ==== shipout ==== (111) BADNESS 0 (missing: -11.72pt page: 0.0pt minus 0.0pt)

3: <--- long page
3: ==== shipout ==== (195) BADNESS 13 (missing: -35.14156pt page: 10.0pt minus 0.0pt footnote: 4.0pt minus 2.0pt)

4: <--- normal page
4: ==== shipout ==== (285) BADNESS 0 (missing: -17.68031pt page: 4.0pt minus 2.0pt)

5: <--- normal page
5: ==== shipout ==== (378) BADNESS 31 (missing: -54.2393pt page: 4.0pt minus 2.0pt footnote: 4.0pt minus 2.0pt)

6: <--- normal page
6: hard page break (444)
6: ==== shipout ==== (445) BADNESS 3 (missing: -43.61864pt page: 12.0pt minus 2.0pt footnote: 4.0pt minus 2.0pt)

7: <--- normal page
7: paragraph with looseness -1 (457)
7: ==== shipout ==== (552) BADNESS 0 (missing: 0.0pt page: 0.0pt minus 0.0pt)

8: <--- normal page
8: paragraph with looseness -1 (553)
8: ==== shipout ==== (33) BADNESS 38 (missing: 5.80836pt page: 8.0pt minus 0.0pt)

9: <--- normal page
9: ==== shipout ==== (173) BADNESS 9 (missing: 3.60957pt page: 0.0pt minus 0.0pt float: 8.0pt)
```



Splitting a book in two — How to?

- ▶ How to handle page numbers
- ▶ How to handle references to page numbers?
- ▶ How to deal with the index?
- ▶ How to deal with the bibliography?



Splitting a book in two — Print version

- ▶ Restart page numbers in part II
 - to keep numbers below 1000
 - and have a clean start for part II
- ▶ Prefix references across parts with I- or II-
 - within a part we use just the page number
- ▶ Use separate bibliographies for each part
 - some entries appear in both bibliographies in that case
- ▶ Use a combined index for both parts
 - placed into each book for easy reference
- ▶ Indicate the part of the entry with I- or II-
 - once per entry to save space









Splitting a book in two — Digital version

- ▶ Both parts as a single PDF
- ▶ Keep main matter pagination identical to the print version
 - This allows switching between print and digital
- ▶ Alter the front matter of Part I
 - to show a complete TOC, LOF, and LOT
- ▶ Drop the front matter of Part II
 - except for title page, dedication, foreword, and preface
- ▶ Make a single bibliography
 - This alters the citation numbers across the whole text
 - It also required changes in 2 examples, because they reference entries in the bibliography



How to make a good index

`\AddToHookNext`, -I 429, -II 673, 674, 680, 682
`\addtolength`, -II 652
 error using, -II 717, 734
 (calc), -II 687, 689
`\addvspace`, -I 53f, 60, 63-67, 71, 99, 344, -II 655, 656, 657
 error using, -II 737
 tracing output produced from, -II 771
`\adfdoubleflourishleft` text symbol  (adorn), -II 118
`\adfdoubleflourishright` text symbol  (adorn),
 -II 118
`\adfflatleafsolidright` text symbol  (adorn), -II 118
`\adfflowerleft` text symbol  (adorn), -II 118
`\adfhangingleafright` text symbol  (adorn),
 -II 118
`\adorn` (adorn), -II 118
 adorn package, -II 118
`\adjoincluegraphics` (adjustbox), -I 601
 adjust option (cite), -II 480
`\adjustbox` (adjustbox), -I 595, 596-600, 601
 adjustbox env. (adjustbox), -I 595, 600
 adjustbox package, -I 587, 595-601, 614, -II 813
`\adjustboxset` (adjustbox), -I 600
`\adjustimage` (adjustbox), -I 601
`\ADLdrawingmode` (arydshln), -I 470
 Adobe Illustrator program, -I 722
 Adobe InDesign program, -I 722
 Adobe Source Pro fonts, description/examples, -II 35, 112
`\advance`, -II 687
`\aldine` text symbol  (fourier-orns), -II 119
 Alegreya package, -I 662, 698, -II 11, 315
 Alegreya fonts, description/examples, -I 503, 662, 695,
 697ff., 707ff., 713, 718f., -II 9, 11, 107, 109
 AlegreyaSans package, -I 662, -II 11
`\aleph` math symbol \aleph , -II 213
 Algol value (listings), -I 323
 Algol fonts, description/examples, -I 701, 712, -II 89
 algotrevived package, -I 703, -II 90
 algorithmic env. (algpseudocode), -I 322
 algorithmicx package, -I 322
 algorithms package, -I 322
 algpseudocode package, -I 322
 align env. (amsmath), -I 86, 94f., 336,
 -II 132, 133, 138, 139f., 148, 151, 153, 162, 174
 adjusting with `\minalignsep`, -II 139f.
 error using, -II 718, 730
 interrupted, -II 143
 align key
 (enumitem), -I 269, 270, 271
 (keyvaltable), -I 495f., 500, 502f., 504
 align* env. (amsmath), -II 132, 171, 174, 181f., 184
 alignat env. (amsmath), -II 132, 139
 alignat* env. (amsmath), -II 132
 aligned env. (amsmath), -II 132, 140f., 156
 adjusting with `\minalignsep`, -II 141
 error using, -II 718, 721f.
 not supported by empheq, -II 174



A few last minute disasters after copyediting

- ▶ Minimally adjusting the font size for Typewriter
 - That can't change much, can it? **Yes it can**
- ▶ Adding a cover page as requested by production
 - **That messed up all the double spreads in the front matter and we nearly missed it**
- ▶ Using bibunits in the digital version (with only one unit)
 - **This resulted in dead links to the bibliography in the first half of the product — detected by our production manager**
- ▶ Spot color didn't work in one example, so we adjusted the example as requested by production
 - **but forgot to change the surrounding text with it**

Those were still caught in time, but who knows what we don't know yet . . .



- ▶ As with previous books there is an errata file as part of the \LaTeX distribution, use

```
texdoc tlc3
```
- ▶ It's source and the newest version is also available from <https://www.latex-project.org>

Errata entries send to us have a chance to win a price, but anyway all corrections makes the book better!

— So thanks for taking the time



Thank you ^(ub)
and ^(eb)
Happy T_EXing ^(b)
BONN, JULY 2023 ^(sb,sc)

Alegreya (with old style numerals) — described on page II–11 ^(m,it)

