Notes on producing TLC3

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The finished product

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.
Publication data

- Number of pages in the print version
  - Part I = 976  (= 16 × 61)
  - Part II = 1008  (= 16 × 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 ($\approx$ 1 year)
- work through 5000 packages on CTAN
- classify them according to functionality, usability, and correctness

Second phase: describe ($\approx$ 3 years)
- develop useful examples
- discuss with authors, resolve issues, ...
- describe the packages

Third phase: produce ($\approx$ 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
- \texttt{titletoc}
  - for partial table of contents
- \texttt{array}, \texttt{tabularx}, \texttt{booktabs}
  - for tables, in a few cases also \texttt{longtable} or \texttt{multicol}
- \texttt{graphicx}, \texttt{overpic}
  - for figures
- \texttt{caption}
  - for float captions, no other float package necessary
- \texttt{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
  - BibTeX 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

▶ pdftcrop, 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

- **mkjobtexpf**
  - 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 \texttt{l} (long), \texttt{s} (short), \texttt{f} (forced), or \texttt{=} (normal).

For example, for chapter 1:

```
= 1
1
1
= 5
= = 
= = 
= = 
1 11
1
1
1
= 
= 
= 
= 
= 
= 
= 
= 
= 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
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
Off to lunch ...

Thank you^{ub}
and^{eb}
Happy TExing^{b}

Bonn, July 2023^{sb,sc}

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