Updating the `nostarch` class

Boris Veytsman

Abstract

No Starch Press's house style has interesting typographic features. Their implementation posed some TEXnical challenges described in this paper.

1 Introduction

No Starch Press was founded in 1994 by a charismatic publisher, Bill Pollock, who proudly displays on the company's web page a personal story of being hired — and fired — by the major players in the business until he established his own (see `nostarch.com/about`). *No Starch Press* positions its products as *the finest in geek entertainment* and boasts such titles as *Python Crash Course, Python for Kids, How Linux Works,* and *Hacking: The Art of Exploitation*, with topics spanning security, hacking, LEGO, and series like *The Manga Guide*, covering Biochemistry, Calculus, Cryptography, etc., up to the Universe.

It is not surprising that this publisher has strong opinions about the design of their books. Indeed, *No Starch Press* books have a distinct house style, sometimes rather unusual for technical literature. It was an interesting challenge to implement them in LATEX. I started this task in 2008 with the first release of the `nostarch` class. Since then the publisher's team made many *ad hoc* changes to the original class, suitable for the tasks at hand. Some of these changes assumed manual adjustments of the input, which was error-prone and time consuming. The advent of Overleaf increased the number of authors that used LATEX for submission, which made these manual adjustments unviable. Thus I was contacted by the publisher with the request to update the class and add new features. In this paper I describe several typographical challenges presented by the class and the ways I approached them.

2 URL breaking

Since the advent of the Internet, URLs have been a nemesis of compositors. A long string of text with no obvious hyphenation points presents an obvious problem for paragraph setting.

The package `url` [1] solves this problem by allowing breaking of URLs. It is a highly customizable package, used internally by the ubiquitous `hyperref` [4], and is the *de facto* standard of URL typesetting in the LATEX world.

Still, even with this package certain problems remain. For example, how do we split a URL containing a hyphen? If we split `https://hyphenated-url.org` before `url.org` (as happened here!), the reader may be confused as to whether the hyphen belongs to the URL or just signifies the break. That is why the `url` package does not allow breaking after hyphens by default: you need to explicitly enable it with the `hyphens` option. *No Starch Press* offers a rather elegant solution: it allows breaks *before* hyphens only, so the reader is not confused by the trailing hyphens.

The full house rules are more complex. Breaks are allowed as follows.

1. *After* the symbols: `# > ] ) } :`
2. *Before* the symbols: `. _ = & - ! ? | , ; @ ’ " + < [ ( {`
3. Breaks are not allowed before `/`, so expressions like `https://` are never split.

To implement these rules, we first note that the `url` package typesets URLs as math expressions. The symbols after which breaks are allowed are declared as *mathop* or *mathbin* atoms, and the standard TEX rules for inline math expressions line breaking apply. However, this approach needs a modification if we want to break an expression *before* a symbol. Fortunately, the package provides a `\UrlSpecials` macro, which allows one to associate any behavior with any symbol. Thus we can allow breaks before the dot using the following code:

```
\g@addto@macro{\UrlSpecials}{%
   \do\.{\penalty\UrlBreakPenalty
         \mathchar46\relax}}
```

Note that `\mathchar46` is a dot symbol. Similarly, we can disallow any break before the slash with:

```
\g@addto@macro{\UrlSpecials}{%
   \do\/{\unpenalty\penalty\@M
      \mathchar47\penalty\UrlBreakPenalty}}
```

There is an additional problem if the author uses the `amsmath` [2] package. An attempt to redefine the opening bracket leads to the `Bad mathchar (32768)` error message. At TUG'23 David Carlisle explained that the problem is in the macro `\resetMathstrut@` added by `amsmath` to the `\everymath` hook and redefining the character code of the opening bracket. Fortunately, the `url` package has its own hook, `\Url@MathSetup`, called *after* `\everymath`. Thus we can nullify this macro for URLs only:

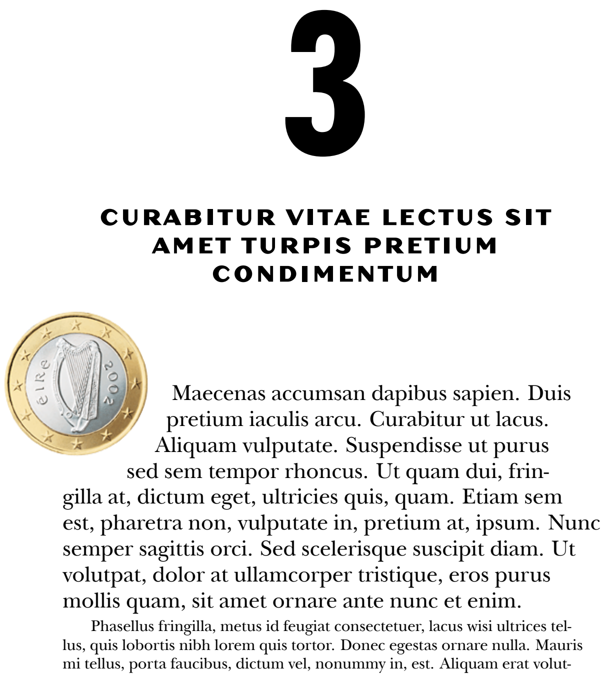
```
\g@addto@macro{\Url@MathSetup}{%
\let\resetMathstrut@\relax}
```

3 Chapter opening

The chapters in *No Starch Press* books have quite an impressive opening: the first paragraph is typeset in a larger font, and there is a space for the "circular art", as shown in Figure 1. Happily, LATEX has

Boris Veytsman

doi.org/10.47397/tb/44-2/tb137veytsman-nostarch



3

CURABITUR VITAE LECTUS SIT AMET TURPIS PRETIUM CONDIMENTUM

Maecenas accumsan dapibus sapien. Duis pretium iaculis arcu. Curabitur ut lacus. Aliquam vulputate. Suspendisse ut purus sed sem tempor rhoncus. Ut quam dui, fringilla at, dictum eget, ultricies quis, quam. Etiam sem est, pharetra non, vulputate in, pretium at, ipsum. Nunc semper sagittis orci. Sed scelerisque suscipit diam. Ut volutpat, dolor at ullamcorper tristique, eros purus mollis quam, sit amet ornare ante nunc et enim.

Phasellus fringilla, metus id feugiat consectetuer, lacus wisi ultrices tellus, quis lobortis nibh lorem quis tortor. Donec egestas ornare nulla. Mauris mi tellus, porta faucibus, dictum vel, nonummy in, est. Aliquam erat volut-

Figure 1: A chapter opening in *No Starch Press* style

a mechanism for setting this, the `\@afterheading` hook in the sectioning macro. The `nostarch` class adds to this hook, among other things, the following code, which uses the switch `\if@firstpara`:

```
\everypar{%
 \if@firstpara
  \rule{\z@}{49\p@}%
  \ifx\@chapterart\@empty
  \else
   \makebox[0pt][r]{%
       \raisebox{-0.5in}[0pt][0pt]{%
       \@chapterart\hspace{0.21in}}}%
   \parshape=5
   0.963in 3.622in   0.913in 3.672in
   0.813in 3.772in   0.563in 4.022in
   0in \textwidth
 \fi
 \fontsize{14pt}{16.5pt}\selectfont\parskip=3pt
 \else
   \parskip=0pt \normalsize\selectfont
  \fi
 \@firstparafalse}
```

Admittedly, this is rather old-fashioned code, using `\everypar`. A better solution would be to use the paragraph hooks relatively recently added to the LaTeX kernel.

4 Captions

The most difficult task so far has been automatic formatting of captions. *No Starch Press* house style does not center figures and tables: they are left justified with figure captions after the figures, and table captions before the figures. However, a full width caption with a narrow left justified figure body looks rather ugly. Therefore the house style has another requirement: the width of the caption should be no longer than the width of the body, as demonstrated in Figures 2 and 3. Fortunately, the `caption` package [5], used by the `nostarch` class internally, allows typesetting a caption in a parbox of the given width. We just need to calculate this width automatically.

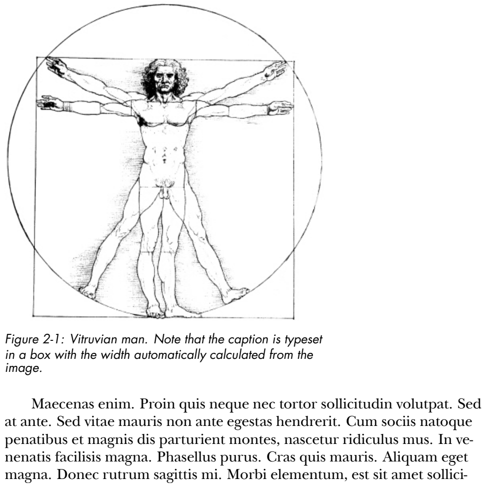


Figure 2-1: Vitruvian man. Note that the caption is typeset in a box with the width automatically calculated from the image.

Maecenas enim. Proin quis neque nec tortor sollicitudin volutpat. Sed at ante. Sed vitae mauris non ante egestas hendrerit. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. In venenatis facilisis magna. Phasellus purus. Cras quis mauris. Aliquam eget magna. Donec rutrum sagittis mi. Morbi elementum, est sit amet sollici-

Figure 2: A figure in *No Starch Press* style

It is relatively easy to do with figures. In most cases figures have just one graphical box. We measure this box and use it to typeset the width of the caption. Note that in TeX the examination of the last box is a destroying operation: we need to return the box to the list if we want to preserve it. We add to the `\endfigure` the following command, `\nostarch@measurecaptionwidth`, defined as:

```
\newcommand\nostarch@measurecaptionwidth{%
 \ifnostarch@overridecaptionwidth\else
 \par
 \setbox\@tempboxa\lastbox
 \setbox\@tempboxa=\hbox{\unhbox\@tempboxa}%
 \global\setlength{%
    \nostarch@captionwidth}{\wd\@tempboxa}%
 \box\@tempboxa\par
 \fi
 \global\nostarch@overridecaptionwidthfalse
}
```

The flag `\ifnostarch@overridecaptionwidth` is discussed below.

The situation with tables is a little bit more complex. When we typeset the caption of a table, we do not know the width of the table, since the body is not yet typeset. Therefore we use the usual LaTeX trick: at the end of a table we save the width of the body to the `.aux` file. At the beginning of the table we check if it has been defined in the previous

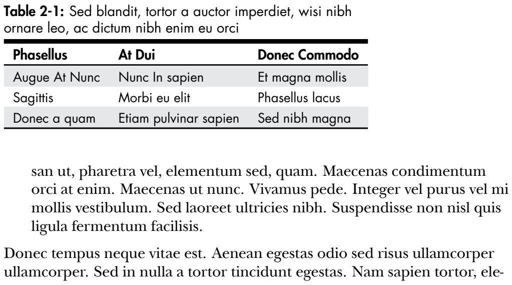


Table 2-1: Sed blandit, tortor a auctor imperdiet, wisi nibh ornare leo, ac dictum nibh enim eu orci

Phasellus	At Dui	Donec Commodo
Augue At Nunc	Nunc In sapien	Et magna mollis
Sagittis	Morbi eu elit	Phasellus lacus
Donec a quam	Etiam pulvinar sapien	Sed nibh magna

san ut, pharetra vel, elementum sed, quam. Maecenas condimentum orci at enim. Maecenas ut nunc. Vivamus pede. Integer vel purus vel mi mollis vestibulum. Sed laoreet ultricies nibh. Suspendisse non nisl quis ligula fermentum facilisis.

Donec tempus neque vitae est. Aenean egestas odio sed risus ullamcorper ullamcorper. Sed in nulla a tortor tincidunt egestas. Nam sapien tortor, ele-

Figure 3: A table in *No Starch Press* style

run, and if yes, we use it. We also need to check whether the current table width is the same as in the previous run. If not, we need to ask the user (or a program like `Makefile` or `llmk` or `arara`) to re-run LaTeX. We save the current widths in macros with the names `\nostarch@tbl@i`, `\nostarch@tbl@ii`, ...: we need to use a separate counter for tables, since `nostarch` numbers the tables per chapter. The following code saves the width of the current table:

```
\nostarch@measurecaptionwidth
\if@filesw
  \immediate\write\@auxout{%
  \gdef\expandafter\noexpand
    \csname nostarch@tbl@\romannumeral
            \c@nostarch@tbl\endcsname
    {\the\nostarch@captionwidth}}%
\fi
\expandafter\ifx
  \csname nostarch@tbl@\romannumeral
          \c@nostarch@tbl\endcsname\relax
  \edef\@tempa{\the\textwidth}%
\else
  \edef\@tempa{\csname nostarch@tbl@
    \romannumeral\c@nostarch@tbl\endcsname}%
\fi
\expandafter\ifdim\@tempa=\nostarch@captionwidth
\else \gdef\nostarch@tbl@warn{%
  \ClassWarningNoLine{nostarch}%
    {Table widths have changed. Rerun LaTeX.}}%
\fi
```

The reading code part performs two tasks. First, it steps the table number `nostarch@tbl`. Second, it sets the width of the caption:

```
\stepcounter{nostarch@tbl}%
\expandafter\ifx
  \csname nostarch@tbl@\romannumeral
          \c@nostarch@tbl\endcsname\relax
  \edef\@tempa{\the\textwidth}%
\else
  \edef\@tempa{%
    \csname nostarch@tbl@\romannumeral
            \c@nostarch@tbl\endcsname}%
\fi
\expandafter\setlength\expandafter
  \nostarch@captionwidth\expandafter{\@tempa}%
```

Another special case is long tables typeset with the `longtable` package [3]. Fortunately, long tables know its width, so we just need to read it. Here is the corresponding code:

```
\ifnostarch@overridecaptionwidth\else
  \global\setlength{\nostarch@captionwidth}{\z@}%
  \bgroup
    \def\LT@entry##1##2{%
      \global\addtolength{%
        \nostarch@captionwidth}{##2}}%
    \csname LT@\romannumeral\c@LT@tables
    \endcsname
  \egroup
\fi
\global\nostarch@overridecaptionwidthfalse
```

Above, we deferred the discussion of the flag `\ifnostarch@overridecaptionwidth`. In fact, no automatic system is 100% accurate. Sometimes a figure or a table contains several boxes of different widths arranged vertically. Sometimes it is too narrow. Thus it makes sense to allow the user to override the algorithm. The command `\NextCaptionWidth` with one argument does just that:

```
\newcommand\NextCaptionWidth[1]{%
  \global\nostarch@overridecaptionwidthtrue
  \global\setlength{\nostarch@captionwidth}{#1}%
}
```

It sets the width of the following caption to the argument and informs the measuring code to skip the measuring.

5 Conclusion

The TeX programming layer, even in the "old" incarnation of LaTeX 2_ε, is quite flexible. It can satisfy many typesetting requirements and provide automatic composition — even when the requirements are rather unusual, as with some of those of *No Starch Press*.

References

[1] D. Arseneau. *The `url` package*, 2013. ctan.org/pkg/url

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[3] LaTeX Project Team, D. Carlisle, D. Kastrup. *The `longtable` package*, 2021. ctan.org/pkg/longtable

[4] LaTeX Project Team, Oberdiek Package Support Group, et al. *The `hyperref` package*, 2023. ctan.org/pkg/hyperref

[5] A. Sommerfeldt. *The `caption` package*, 2023. ctan.org/pkg/caption

◇ Boris Veytsman
borisv (at) lk dot net
https://borisv.lk.net