Hints and Tricks

'Hey — it works!'

Jeremy Gibbons

Welcome once again to *Hey — it Works!*, a home for intriguing, elegant or just plain useful (LA)TEX techniques. Please send me any ideas that you have for articles. Back issues of the column are available from my web page.

This issue we have four articles. The first, by my ex-colleague Paul Hafner, explains how to include in a document the page range of the document. The second is my own, and shows how to get text italics instead of math italics in maths mode by default. We conclude with two short pieces: one by Ramón Casares, showing how to fill the last line of each paragraph with a rule to prevent forgery by the addition of extra text, and one by Donald Arseneau, showing how to produce a 'closed surface integral' symbol.

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1 Determining the page range of a document

It is customary for journals to have an imprint on the first page of each article identifying the journal and providing the bibliographic details (volume, year, page range). LATEX can provide the page information, but it does not come without an effort. The page number of the first page is easily found: place a label at the start of the article, most conveniently using the command

```
\AtBeginDocument{\label{firstpage}}
```

Then the page number of the first page will be available via `\pageref{firstpage}`.

For the last page one is tempted to opt for the symmetric solution:

```
\AtEndDocument{\label{lastpage}}
```

However, the document *LATEX 2ε for class and package writers* (file `clsguide.tex`) explains carefully that the label will be placed *before* any end floats. The remedy provided in `clsguide` is to insert `\clearpage` before the label:

```
\AtEndDocument{\clearpage\label{lastpage}}
```

However, if you follow this all too literal reading of the documentation, the label will remain undefined, i.e., nothing will be written to the `.aux` file.

Now a solution is obvious: instead of `\label` we insert the code which writes the appropriate information to the `.aux` file (we steal it from `latex.ltx`). Since the `\clearpage` has moved us onto the 'page' after the last, we decrement the page counter before writing it out, and (for completeness) increment it again afterwards.

```
\AtEndDocument{\clearpage
  \addtocounter{page}{-1}%
  \immediate\write\@auxout{%
    \string\newlabel{lastpage}%
    {{}{\thepage}}}%
  \addtocounter{page}{1}%
}
```

In fact, at the CTAN archives there is a package `lastpage` by Jeff Goldberg that does exactly this.

An alternative implementation of the same idea redefines the command `\enddocument` (defined in the file `latex.ltx`), inserting the additional code *after* the `\clearpage` in line 4 of this definition. This has the advantage that collisions with other insertions via `\AtEndDocument` (say, if the article uses other packages) are less likely (such insertions might assume that the `\clearpage` command has not yet been issued; in this case we have to be very careful about the order in which they are loaded). On the other hand, to remain fully compatible and up to date, the maintainer of a package which redefines a critical command such as `\enddocument` has a six-monthly maintenance task for life: to check if a new release of LATEX has introduced changes of this command, and to accommodate them. I cannot foresee too many occasions where one would like to insert code at that late stage (lack of imagination?) but there could be a case for a *very-end-hook* at the position in question, or maybe a routine label for the last page that can be accessed by everyone.

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2 Text italics in maths mode

In most of mathematics, it is conventional to use single letters for variables. If two letters are adjacent, as in 'xy', this is read as two separate quantities x and y multiplied together. For this reason, TEX and LATEX use two italic fonts: 'text italics' for italic characters in text, and 'math italics' for italic characters in maths. The difference is clearly visible with regard to ligatures ('*difficult*' versus '$difficult$'), but most of the letters have slightly different shapes in the two fonts.

In contrast, in my corner of computer science, it is common to use words instead of single letters as variable names; for example, I might write '$flatten\ xss$'. This looks horrible using the default math italics. I can get round the problem by using `\mathit` to select text italics for every variable mentioned in my document; this looks fine ('*flatten xss*') but is a pain to type. It would be nice to make letters appear in text italics by default.

It is tempting to use `\SetSymbolFont` for this:

```
\SetSymbolFont{letters}{normal}
  {OT1}{cmr}{m}{it}
```

This makes maths family 1, from which letters in maths mode are normally taken, use text italics instead of math italics. This does achieve the desired effect, but it has some unfortunate side-effects too. Not only the letters, but also many other symbols are taken from family 1. Because Computer Modern text italics has a different encoding from math italics, many of these other symbols now appear as the wrong glyph. For example, full stops appear as colons, commas as semi-colons, the Greek letters are all wrong, and so on. Of course, the definitions of all these symbols can be changed, to take them from other families, but this is a both nuisance and error-prone: a quick count through `fontmath.ltx` reveals that more than 50 definitions need changing.

Fortunately, there is a better solution. This is to declare a new symbol font for text italics:

```
\DeclareSymbolFont{textit}{OT1}{cmr}{m}{it}
```

and to take each of the letters from this new symbol font:

```
\DeclareMathSymbol{a}{\mathalpha}{textit}{`a}
\DeclareMathSymbol{b}{\mathalpha}{textit}{`b}
...
\DeclareMathSymbol{Z}{\mathalpha}{textit}{`Z}
```

(This must be done in the document preamble.)

When long variable names can also include digits, it may be preferable also to make the digits italic by default:

```
\DeclareMathSymbol{0}{\mathalpha}{textit}{`0}
...
\DeclareMathSymbol{9}{\mathalpha}{textit}{`9}
```

This gives, for example, '*inits1*' instead of '$inits1$'. However, this makes *all* digits in maths mode italic, which may not be what you want; somehow, the number *3.14159265* does not look quite right.

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3 Anti-appending rule

When important documents, as contracts, were hand written it was usual, at least in Spain, to complete the last line of every paragraph with a line. The purpose of the line was to avoid the completion of the paragraph after signing the document to change the meaning of the agreement.

It is in fact an amusing exercise to take the last document written by, let's say, the boss and make a nonsense of it just using the part of the line that was left blank in each paragraph.

If you fear that one of your documents could be faked by your enemies or if you just want to imitate the old legal style of writing, then TeX makes it easy.

```
\def\unfakeablepar{\unskip\nobreak
  \leaders\parrule\hskip\parfillskip
  \vadjust{}{\parfillskip=0pt\endgraf}}
\def\parrule{\hrule height 2.2pt
  depth -1.8pt\relax}
```

To activate the feature just write

```
\let\par=\unfakeablepar
```

To return to the fakeable style write

```
\let\par=\endgraf
```

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4 Closed surface integral

Donald Arseneau sent in this quick definition of a closed surface integral `\ointint`, a double integral like `\oint`:

$$\oiint$$

This is defined by:

```
\newcommand\ointint{\begingroup
  \displaystyle \unitlength 1pt
  \int\mkern-7.2mu
  \begin{picture}(0,3)
    \put(0,3){\oval(10,8)}
  \end{picture}
  \mkern-7mu\int\endgroup}
```

Note that if we had used braces `{...}` here instead of `\begingroup...\endgroup`, the subscript would be attached to the whole `\ointint` subformula (as on the left, below) instead of being attached to the second `\int` and tucking neatly under it (as on the right):

$$\oiint{}_S \qquad \oiint_S$$

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