

Late-Breaking News

Fixed-Point Glue Setting: Errata

Donald E. Knuth

I thank Eberhard Mattes for calling my attention to an error in the demonstration WEB program I published in *TUGboat* 3,1 (March 1982), 10–27. After looking more closely at that program, I noticed that it actually contains at least *two* errors. I should have known better than to rush into print with the second draft of a program on which I had spent only a few hours of time; but I was just beginning to learn how to program in WEB, and the new methodology had lulled me into thinking that I understood what I was doing.

The most serious error occurs in line 9 of the program in section 14. That line should be:

```
if a + b + k - h = 15 then
  c ← (q + 1) div 2 {l = 16 - k}
```

This error caused the answers for test data set 4, on page 23 of the article, to be only about half as big as they should have been; the correct value of c for that data set is 30670, not 15335.

The other error arises when the number b in the algorithms turns out to be greater than 30. I believe the best way to correct it is to replace the four lines beginning with 'if $b < 0$ ' in section 12 by the following:

```
if (b < 0) ∨ (b > 30) then
  if b < 0 then write_ln('!_Excessive_glue. ');
  { error message }
  b ← 0; c ← 0; { make f(x) identically zero }
end
```

After writing that article I learned that standard Pascal also wants the specification ': 0' to become ': 1' in *write* and *write_ln* statements (sections 21, 24, and 25; five places altogether).

I also learned that the language is properly called Pascal, not PASCAL; and I began calling scaled points 'sp' instead of 'spt'.

Although the comments in section 1 state that my algorithm uses only 16-bit multipliers and divisors, the truth is that it also might use larger multipliers and divisors that happen to be powers of 2. Such multiplications and divisions can be replaced by binary shifts, in a language like C.

I overlooked a few typographic errors: 'process or' should be 'processor' on the first line of page 11, and 'as' should be 'that' on line 8 from the end

of that page; 'hve' should be 'have' in section 4, line 20, and '[2^{-a}x]' should be '[2^{-a}x_i]', a few lines further down. Also 'x.1' should be 'x_i' in line 5 of section 21.

Finally, I should have used the same notation in the program of sections 12–14 as I used in the theoretical discussion of section 4.

A corrected version of the program, incorporating the remarks above and a few other things, is now available in standard T_EX electronic archives under the file name `glue.web`.

Looking on the bright side, I'm pleased to report that T_EX now processes the entire woven program in only 10 seconds on my home computer; according to the article, the same task took 40 seconds in 1981, using the KL10 mainframe on which I did all the development of T_EX.

And oh yes, one further correction is necessary: The amount of time spent proofreading and debugging, mentioned on page 11 of my article, should now be increased from 'about two hours' to 'about six hours'.

Production Notes

Barbara Beeton

Input and input processing

Electronic input for articles in this issue was received by mail and on floppy disk. Most articles were fully tagged for *TUGboat*, using either the plain-based or L_AT_EX conventions described in the Authors' Guide (see *TUGboat* 10, no. 3, pages 378–385). Several authors requested copies of the macros (which we were happy to provide); however, the macros have also been installed at `labrea.stanford.edu` and the other archives, and an author retrieving them from an archive will most likely get faster service. Of course, the TUG office will provide copies of the macros on diskette to authors who have no electronic access.

The number of articles in this issue was split about evenly between "plain" and L_AT_EX; pages too were about evenly divided. In organizing the issue, attention was given to grouping bunches of plain or L_AT_EX articles, to yield the smallest number of separate typesetter runs, and the least amount of handwork pasting together partial pages. This also affected the articles written or tagged

by the staff, as the conventions of `tugboat.sty` or `ltugboat.sty` would be chosen depending on what conventions were used in the preceding and following articles; no article was changed from one to the other, however, regardless of convenience.

This issue was mercifully free of insidious redefinitions of macros that already exist in the styles used; either authors were more careful, or the mechanism that isolates one article from another when several are being combined into a single run is finally working at that level. We had some problems of interaction within the *TUGboat* macros, however, that more than made up for the lack of author-provided problems.

As has been customary for the past few issues, several articles required font work; these included the articles by Alan Jeffrey (p. 227) and Yannis Haralambous (p. 224). The latter rooted out some bugs in the laser printer device driver used at AMS (it does not deal well with 256-character fonts) and forced a delay when no one was available during a weekend to process proof from the typesetter.

One article, by Malyshev, Samarin and Vulis (p. 212), required the new L^AT_EX font selection scheme; another, by Hefferon (p. 270), required the `multicolors` option. Other L^AT_EX articles were processed with whatever version was convenient.

The following articles were prepared using L^AT_EX.

- Nelson Beebe, *President's introduction*, page 205.

- Barbara Beeton, *Editorial comments*, page 208.
- Walter Obermiller, *T_EX in Germany*, page 211.
- Michel Goossens, *L^AT_EX meeting in London*, page 212.
- Reinhard Föbmeier, *X bitmaps in T_EX*, page 229.
- Nico Poppelier, a book review, page 235.
- Victor Eijkhout, three articles, pages 253, 260, and 272.
- Jim Hefferon, *Getting \answers*, page 270.
- all items in the L^AT_EX section, pages 284 ff.
- abstracts of the *Cahiers GUTenberg*, page 305.
- announcement of T_EX91 and GUTenberg'91 in Paris, page 309.

Output

The bulk of this issue was prepared at the American Mathematical Society from files installed on a VAX 6320 (VMS) and T_EX'ed on a server running under Ultrix on a DECsystem 5000. Output was typeset on an APS- μ 5 at the AMS using resident CM fonts and additional downloadable fonts for special purposes.

No pasteup of camera-ready items or illustrations was required for this issue.

The output devices used to prepare the advertisements were not usually identified; anyone interested in determining how a particular ad was prepared should inquire of the advertiser.

Coming Next Issue

Inside Type & Set

Graham Asher describes the Type & Set system, which consists of T_EX, several T_EX macro packages, a suite of C programs including a style sheet editor, an automatic page make-up system that replaces T_EX's output mechanism, and a family of device drivers. This system was developed to overcome problems which make T_EX difficult to use for commercial journal and book publishers.

Invisibility using virtual fonts

Sebastian Rahtz proposes an alternate method for generating "invisible" fonts as used by S_LT_EX. This method makes it possible to use the standard PostScript fonts in place of Computer Modern. [Delayed by technical problems.]

Arrows for technical diagrams

David Salomon, requiring arrows of more varieties than are available in unextended (L^A)T_EX, has created a font of arrowheads. Since T_EX does not have diagonal rules, only horizontal and vertical arrowheads were developed. However, the methods used can easily be extended for diagonal arrowheads.

Some Basic Control Macros for T_EX

Jonathan Fine uses techniques that require only T_EX's mouth to define and describe macros `\break`, `\continue`, `\switch`, `\return`, `\exit`, `\chain`, and labels `\end` and `'.'` that make it easier to write T_EX macros.

TUG Business

Financial Reports of the T_EX Users Group

Ron Whitney, Acting Business Manager

Following are the TUG balance sheets along with revenue and expense statements for the years 1989 and 1990. In years prior to 1990, our accountant has performed financial *reviews*, as opposed to full *audits*. We felt that it was time the organization underwent an audit of its books and so went through this closer inspection at the end of year 1990. Also included below is the 1991 budget approved by the TUG Board in March of this year.

These are difficult times for TUG, as they are for many similar organizations. Although we had been operating at close to a breakeven level for several years through 1989, there was a considerable operating deficit (\approx \$93,000) for 1990. Roughly half of this total was due to a general decrease in sales and attendance at meetings and courses, the other half being involved with changes in administration within the TUG office (see the prototype issue of *T_EX and TUG News* for a full description of those changes). Our assets entering 1991 were equivalent to about 40% of the operating budget.

The 1991 year-to-date figures will appear in the next regular issue of *TUGboat* (12#4). The 1991 budget forecasts a small surplus, but at this point we believe we will be looking at deficit figures by the end of the year. The cause again is due to a decrease in traffic for sales and courses, and perhaps also, in membership.

If you wish to see more detailed information or have any further questions, please write or call the TUG office at

P. O. Box 9506
Providence, RI 02940
Phone: (401) 751-7760