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Status Reports

TeX 3.0 and METAFONT 2.0

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Introduction

During the last few years, use of TeX has spread to Chinese, Japanese, Korean, Coptic, Russian, Thai, Vietnamese, several Indian languages, Persian, Arabic, Hebrew, and all major European languages. These uses made some of the limitations of TeX 2.x more evident. The most serious of these are the seven-bit character set and uni-lingual hyphenation. Consequently, Donald Knuth announced at the 10th Annual Meeting of TUG, held at Stanford University in August, 1989, that a new version of TeX and METAFONT would be produced to address problems of multinational support; those versions were officially released on the ides of March, 1990. Don resisted calls for more sweeping changes, in the interests of (a) restricting the impact of the changes, and (b) getting back to writing *The Art of Computer Programming* books.

At the time of writing this report (late June 1990), the two new programs, and their related TeXware and METAFONTware, including BibTeX, have been successfully installed on numerous UNIX variants, using version 5.0c of the Web2C translator, as well as on the IBM PC, VAX VMS, and IBM VM/CMS. Several commercial vendors announced release of the new versions at the June TUG meeting. We hope that, by the end of 1990, all TeX users the world over will have had the opportunity to upgrade to the new versions.

What's New

The new features of TeX 3.0 and METAFONT 2.0 are described in detail in [3]. It is important to

emphasize that, apart from the obscure exceptions noted in section 12 of that paper, changes should not affect existing TeX and METAFONT files. In particular, *DVI files are unchanged, and old font files can still be used.*

Here is a list of the current support programs and their versions:

bibtex	0.99c	pltotf	3.2
dvitype	3.2	tangle	4.0
gftodvi	3.0	tex	3.0
gftopk	2.2	texinfo	3.0
gftype	3.0	tftopl	3.1
inimf	2.0	vftovp	1.0
initex	3.0	virmf	2.0
mft	2.0	virtex	3.0
pktofg	1.0	vptovf	1.0
pktype	2.2	weave	4.1

Hyphenation can be applied to input words coded using only 8-bit characters. This means that a user with a European keyboard can enter a word like *liberté* (the accented letter is a single character) without losing a hyphenation opportunity. However, if the word is entered using a control sequence, `libert\'e`, as for earlier versions of TeX, hyphenation will not be tried.

Michael Ferguson has graciously made available a change file for TeX 3.0 that translates input accented character sequences to the internal 8-bit form, and at DVI output time, translates them back again. This change makes it possible for words accented with control sequences to be hyphenated, and seems to be a very valuable extension.

The new ligature mechanism allows letters to change, based on their position within a word. This is of particular importance in Arabic, but may be used in other languages: observe that in normal handwriting, letter shapes may also vary according to position, so a handwriting font might usefully incorporate such ligatures.

`\emergencystretch` (section 7 of [3]) allows better control of excessive white space. L^ATeX users in particular should note this new parameter. The L^ATeX `\sloppy` command sets `\tolerance` to its maximum value of 10000, allowing all lines to be loosely spaced. Under TeX 3.0, a smaller `\tolerance` value can be chosen and `\emergencystretch` can be brought into play when TeX deems it necessary, thus eliminating excessive white space. The L^ATeX bibliography environment by default invokes `\sloppy`; try a two-column bibliography first without `\emergencystretch`, then with it and a reduced `\tolerance` to see the difference.

The changes to the source code are extensive: Don Knuth reports that 218 of T_EX's 1377 modules have been changed, and dozens of modules have been completely rewritten.

It was decided not to issue a new edition of the T_EXbook and the METAFONTbook; instead, the new version of T_EX will be described in a new printing of Volume A of *Computers and Typesetting*, identified by "Ninth printing" on the copyright page. The paperback version of the T_EXbook will be updated in a few months; it will be marked "Seventeenth printing". Presumably, volumes B, C, and D will be similarly updated.

The finder's fee for bugs in the new code is \$10.24. If you discover a bug in the "old" parts of T_EX while you're installing the new version, you win \$163.84.

Why You Should Upgrade

Many people adhere to the "if it ain't broke, don't fix it" rule, also known as the "if it is not necessary to change, it is necessary not to change" axiom. These apply to many things besides software. Consequently, some users will no doubt resist an upgrade, particularly if they see no immediate need for the multinational features in their own documents. Don Knuth views these changes as so important that he wrote [3]: *Let us root out and destroy the obsolete 7-bit systems, even though we were able to do many fine things with them.*

One of the strengths of T_EX lies in its ability to produce the same output from the same input, no matter what the host computer is. Macro writers, and European T_EX users in particular, will be quick to take advantage of the new features; if your system lags behind, you risk being unable to process new documents and macro files in the future.

Character Set Issues

We need to exercise great care in the use of eight-bit input in T_EX documents that are intended to be exchanged with others in their original input form, because positions 128...255 in the character sets do not have universally accepted assignments. Without such an agreement, we seriously risk the loss of the wonderful T_EX file portability that we have heretofore enjoyed. For detailed discussion, see [1, 2] and references cited therein.

Because of the gravity of the character set problem, TUG and several European groups have initiated a joint effort to rapidly produce a proposed character set assignment that can be used for the exchange of T_EX documents. An initial progress re-

port is planned for the T_EX90 meeting in Cork in September, 1990.

Composite Fonts

Eight-bit characters will simplify T_EX input for many users, but what about fonts? Don Knuth certainly has no time to sit down and expand the Computer Modern and Concrete Roman families from 128-character fonts to 256-character fonts. Some commercial fonts already provide larger character sets, but one still has the problem of finding a DVI driver that can support them.

The solution to these is composite fonts [4], also known as 'virtual' fonts. I'd like to take this opportunity to issue a plea for a name change; 'virtual' is not very descriptive, while 'composite' is, and has the advantage of already being in wide use. Also, the term 'virtual fonts' has been in use in my DVI drivers since 1986 with quite a different meaning.

Composite fonts provide for the construction of new fonts, each character of which may be made up of pieces taken from one or more other (possibly composite) fonts, where the pieces are positioned by commands in the DVI language.

Composite font support requires either a DVI-to-DVI program that can convert a DVI file using composite fonts to one that does not, or addition of new code in DVI drivers. Since a lot of existing software is affected by this new feature, it is going to take considerably longer to get such programs developed and distributed.

References

- [1] Nelson H.F. Beebe. Character set encoding. *TUGboat*, 11(2):171-175, June 1990.
- [2] Janusz S. Bień. On Standards for Computer Modern Font Extensions. *TUGboat*, 11(2):175-183, June 1990.
- [3] Donald Knuth. The New Versions of T_EX and METAFONT. *TUGboat*, 10(3):325-328, November 1989.
- [4] Donald E. Knuth. Virtual fonts: more fun for grand wizards. *TUGboat*, 11(1):13-23, January 1990.

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L^AT_EX 2.10

Frank Mittelbach

Remarks on L^AT_EX 2.10 + 3.0

At the TUG meeting in Texas, I was able to announce the availability of the new font selection scheme which will be incorporated in the new L^AT_EX and explained its features. Further work is ongoing, including the redesign of the internal style interface and a new attribute concept. A more detailed talk about this project will be given at the Cork meeting in September.

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International Reports

**DANTE, Deutschsprachige
 Anwendervereinigung T_EX e.V.**

Joachim Lammarsch

On April 14, 1989 in Heidelberg, DANTE (the Deutschsprachige Anwendervereinigung T_EX e.V.), was founded. I was elected chairman of the society, and we also elected a vice chairwoman (Mrs. G. Kruljac-Dronskowski, MPI Stuttgart), a treasurer (Mr. Friedhelm Sowa, Research Center of the University of Düsseldorf), and a secretary (Mrs. Luzia Dietsche, Computing Center of the University of Heidelberg). By May of this year, the user group had about 500 members in West Germany, Austria, Switzerland, East Germany, France, Netherlands, Luxemburg, Belgium, the USA, and Canada.

The principal aim of the society is to encourage advice and cooperation among German-speaking T_EX users. But this is not the only intention. The user group cooperates with other related national and international T_EX groups; and, as well, DANTE represents the interests of the German-language T_EX users to TUG. That is done in coordination with

other European T_EX groups and their national interests.

For its members, DANTE distributes a variety of software, including complete T_EX systems with common macro packages for PCs and Ataris, META-FONT, and drivers. In the future, T_EX for Macintoshes and Amigas will also be distributed. Anyone who has e-mail access can get some of the software via the FTP server in Stuttgart (129.69.1.12) or via `LISTSERV@DHDURZ1.EARN`.

Twice a year a general meeting (held together with the annual conference) takes place for all interested T_EXers. During these meetings some experienced members of DANTE hold courses for free for everyone who wants to attend. Another DANTE activity is to organise training and education for beginners. Together with this activity, DANTE supports its members with information about all that is going on in the T_EX world: because a lot of interested T_EXers have no e-mail access, DANTE distributes T_EXhax and UKT_EX via diskettes.

Last but not least, a quarterly newspaper for members is published, with articles about new macros, style files, dates, reviews, and so on.

In addition to this, there are a lot of other activities and plans to spread T_EX and the knowledge about it, for example, by publishing articles in the most widely circulated computer journals in Germany, or by bringing T_EX into high schools to students and teachers.

Institutions as well as individuals can become members: universities, publishers, computer companies, private persons, students, etc., to name but a few. Dues differ for the various categories.

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