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Fonts

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A FORTRAN VERSION OF METAFONT

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I have been using a Fortran 77 version of **METAFONT** which was developed for Harris Computers. This program was translated from the Stanford SAIL version of the program. The intent was to use **METAFONT** to design characters for the Burmese script and eventually to use it in something similar to **T_EX**. The program is, of course, useable for scripts other than Burmese.

The conversion from SAIL to Fortran 77 was, for the most part, straightforward. A direct statement-for-statement substitution was possible for the major part of the code. However, there were a few problem areas that did not lend themselves to this method. Among the major things that Fortran 77 sorely lacked were:

- Recursive procedure calls
- Strings as nice as those of SAIL
- Case statements
- Macro calls
- Bit manipulations

Each of the problem points was solved in an ad-hoc fashion. Because of this, the translation is not as neat and tidy as I would have liked. No attempt was made to adhere too closely to the ANSI standards for Fortran 77. The data structures and tables used by the program are an exact copy of the SAIL version. The translated program turns out to be 2-1/2 to 3 times more lengthy than the SAIL version in terms of line count. The translation effort took about six weeks of night and weekend work including debugging and testing.

Harris Fortran has several nonstandard features which I used extensively to speed up the translation. It supports a 48-bit integer word as well as bitwise logical operations on them which was quite essential for the direct translation. Memory limitations were not a concern as the machine can address up to 3 megabytes. A 1024x640 raster map was accommodated with no problems. Harris Fortran also supported additional control structures, as well as type checking of variables, which were very useful.

The only output device and display mode currently implemented is a DEC VT-100 fitted with the VT-640 Retrographics board. The characters

drawn by the program can only be viewed in the "drawdisplay" mode. Unfortunately, no suitable hardcopy device is available for the results to be shown here. (Using a Tektronix terminal in the point-plot mode was found to be unbearably slow.) None of the extensive output routines that I received have been translated yet. This includes output for **T_EX**. I neither have a suitable Pascal compiler nor a working **T_EX** program to motivate me to take on the task. However, except for these points, the program does work almost exactly as described in the book "T_EX and **METAFONT**." I do believe that I have captured most of the heart and soul described in the book. **METAFONT** programs from Stanford run with no problems after suitable conversion of the SUAI character set to the standard ASCII set.

I have found **METAFONT** to be quite adequate for defining the Burmese script. The script has evolved from the Pali and Sanskrit languages, and to simplify things, may be said to consist of arcs and straight lines. I felt that there was a lot of room for improving the quality of the fonts as well as introducing new ones. The script does not have a very long tradition of commercial printing as in the West, and hopefully, there is not yet too much inertia about accepting new ideas.

People interested in obtaining a copy of the program may contact me.

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Warnings & Limitations

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Charting the Generation Gulf

Until **T_EX82** is universal, a major source of incompatibility among **T_EX** sites will be the difference in available features owing to the difference in creation dates of the program. Even at a single site, many failures to run a **T_EX** job successfully are the consequence of unknowingly using a less-than-current version of **T_EX**. If some macro that you think should work just won't, it's worth trying to determine the age of your **T_EX**, and here's a quick way to do it.

In the errata list distributed with each issue of TUGboat, additions are dated. Select a suitable item from each generation, and enter these items in chronological order to an on-line **T_EX** session; the first failure will date your program with reasonable accuracy. The following items were suggested during a problems session at the July meeting.

- **T_EX80**: the last ...: \let or \specskip(digit)

- since October 1, 1980: `\topsep` (note - true and magnification may not be implemented even if other items in this group have been)
- since February 4, 1981: `\hbox par SIZE{...}`
- since June 30, 1981:
`\ifx (cs1)(cs2){(true text)}\else{(false text)}`

(At the meeting, `\chcode }=2` was suggested for the last group; when tested at AMS, however, it gave no error message, although it was not acted on.)

The version of \TeX in production at the Math. Society is current as of March 1981. The following log resulted from performing the suggested tests. Note that at least one font code must be assigned to avoid the error "Whoa---you have to assign a font first."

```
@tex
AMS TeX varsize of 11500 created
Wednesday, August 18, 1982 16:07:51
```

```
this run of TeX begun:
Thursday, September 2, 1982 13:08:52
*\font a=cmr10 \:a
*\let \a=\alpha
*\topsep{\vskip 23pt}
*\hbox par SIZE(a)
*\chcode ~=0
*~foo
*\ifx\a\alpha(aa)\else{bb}
! Undefined control sequence.
(*) \ifx
\alpha(aa)\else{bb}
~x
```

Type x again to exit: xNo output file.

Once you have determined the appropriate date, it is advisable to apply all relevant errata to your reference copy of the \TeX manual. This will save both time and embarrassment (from asking silly questions), until \TeX 82 redefines the problems.

Barbara Beeton

FONT CODES IN POPULAR USE

Calvin Jackson

The following tables list the 64 possible *fontcodes* as used in several popular macro packages.

<i>font code</i>	CIT-CS	BASIC	Fácil	AMS \TeX	ACP	<i>font code</i>	CIT-CS	BASIC	Fácil	AMS \TeX	ACP
.						.					
a	cmr10	cmr10	cmr10	cmr10	cmr10	@	cmathx	cmathx	cmathx	cmathx	cmathx
b	cmr9		cmr9	cmr9	cmr9	A	cmr18		cmr18	cmcy10	
c	cmr8		cmr6	cmr8	cmr8	B	cmr12		cmr12		
d	cmr7	cmr7	cmr7	cmr7	cmr7	C	cmdunh		cmdunh	cmcy8	
e	cmr6		cmb8	cmr6	cmr6	D	cmsl12		cmsl12		
f	cmr5	cmr5	cmr5	cmr5	cmr5	E	cmu10		cmu10	cmcy6	
g	cmi10	cmi10	cmi10	cmi10	cmi10	F	cmccsc9		cmccsc9		
h	cmi9		cmi9	cmi9	cmi9	G	cmccsc		cmccsc		
i	cmi8		cmsy9	cmi8	cmi8	H	cmtt8		cmtt8		
j	cmi7	cmi7	cmi7	cmi7	cmi7	I	cmti9		cmti9		
k	cmi6		cmi6	cmi6	cmi6	J	cmti8		cmti8		
l	cmi5	cmi5	cmi5	cmi5	cmi5	K	cmccsc8		cmccsc8		
m	cmccsc		cmr8	cmccsc	cmccsc10	L	cmr30		cmr30		
n	cmsl10	cmsl10	cmsl10	cmsl10	cmsl10	M					
o	cms9		cmsy8	cms9	cms9	N					
p	cms8		cms8	cms8	cms8	O					
q	cmb10	cmb10	cmb10	cmb10	cmb10	P					
r	cmb9		cmi8	cmb9	cmb9	Q					
s	cmb8		cms9	cmb8	cmb8	R					
t	cmtt		cmtt	cmtt	cmtt	S					
u	cmsy10	cmsy10	cmsy10	cmsy10	cmsy10	T					
v	cmsy9		cmi6	cmsy9	cmsy9	U					
w	cmsy8		cmsy6	cmsy8	cmsy8	V					
x	cmsy7	cmsy7	cmsy7	cmsy7	cmsy7	W					
y	cmsy6		cmtt9	cmsy6	cmsy6	X					
z	cmsy5	cmsy5	cmsy5	cmsy5	cmsy5	Y					
:	cmtitl			cms6	cmtitl	Z					
<	cmssb			cmssb	cmssb	[cmti9	
=				cmccsc8	cmsl12	\					
>	cmss8			cmb6	cmss8]				cmti8	
?	cmti10	cmti10	cmti10	cmti10	cmss8	†					
-						-					