

## Fetamont: An extended logo typeface

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### Abstract

The logo font, known from logos like METAFONT or METAPOST, has been very limited in its collection of glyphs. The new typeface *Fetamont* extends the logo typeface in two ways:

- Fetamont consists of 256 glyphs, such that the T1 (a.k.a. EC, a.k.a. Cork) encoding table is complete now.
- Fetamont has additional faces like “light ultracondensed” or “script”.

The `fetamont` package provides L<sup>A</sup>T<sub>E</sub>X support for the Fetamont typeface. Both the package and the typeface are distributed on CTAN under the terms of the *L<sup>A</sup>T<sub>E</sub>X Project Public License* (LPPL).

The following article presents some facets of the Fetamont typeface, explains important techniques and shows the history of the logo typeface.

### 1 Comparison with existing logos

The following picture shows the METAPOST and the METAFONT logos written in Fetamont (gray) and Taco Hoekwater’s Type 1 version of the logo font (outlined).

METAFONT  
METAPOST

There are hardly any differences; only the “S” is significantly different, because its shape was changed by D. E. Knuth in 1997 (see section 6). The other faces of Hoekwater’s *Logo* are also very similar to their corresponding Fetamont faces. Widths and kernings may rarely differ by one unit (except for the “A” in *Logo 9*, which has a strange width).

A comparison with the METATYPE1 logo from Jackowski, Nowacki, and Strzelczyk (2001) shows virtually no differences as well.<sup>1</sup>

METATYPE1

### 2 Comparison with the `mflogo` package

The control sequences defined in the `fetamont` package are analogous to those from the `mflogo` package (Vieth, 1999). `\MF`, `\MP` and `\MT` produce the

<sup>1</sup> I have never seen the original sources of the “Y” and the “1” but I think that my imitated “Y” and “1” are extremely close to the original.

well-known logos of METAFONT, METAPOST and METATYPE1.

### 3 The many faces of fetamont

It is clear that thanks to the power of METAFONT the number of possible faces is endless. However, Fetamont comes in a mere 36 predefined faces. The suffixes of every face are schematically listed in the following table:

Upright				Oblique			
r8	b8	h8		o8	bo8	ho8	
r9	b9	h9		o9	bo9	ho9	
110	r10	b10	h10	lo10	o10	bo10	ho10
Condensed Upright				Condensed Oblique			
lc10	c10			lco10	co10		
		bc40				bco40	
Ultracond. Upright				Ultracond. Oblique			
lq10				lqo10			
Script Upright				Script Oblique			
lw10	w10	bw10	hw10	lwo10	wo10	bwo10	hwo10

Anyone wishing to design a new face for Fetamont can do so by just redefining the parameters of `ffmr10.mf` and saving the file under a new name.

#### 3.1 Script faces

The Fetamont script faces make use of randomized paths that are drawn by a rotated ellipse pen to make it look more handwritten. They may be used for comics or children’s texts:



Since version 1.3, the OpenType versions of the script faces even support the “Randomize” feature.

#### 3.2 Condensed faces

The titles in Knuth’s books show a variant of the logo font that blends with *Computer Modern Sans Serif Demibold Condensed 40*. So I decided to add this variant as *Fetamont Bold Condensed 40* and let also a light and medium variant benefit from the condensation because it looked so good.

LIGHT CONDENSED 10

MEDIUM CONDENSED 10

BOLD CONDENSED 40

#### 3.3 Ultracondensed Face

I went even a step further and created an ultracondensed face for Fetamont. The credits written on

movie posters are often typeset in such ultracondensed faces:

THE MOST IMPORTANT THING IN THE PROGRAMMING LANGUAGE IS THE NAME. A LANGUAGE WILL NOT SUCCEED WITHOUT A GOOD NAME. I HAVE RECENTLY INVENTED A VERY GOOD NAME AND NOW I AM LOOKING FOR A SUITABLE LANGUAGE.

(This is said to be a quotation from D. E. Knuth.)

#### 4 Spacing problems with the “S”

The original spacing of the letter “S” fits perfectly for the combination “OST” as in METAPOST. However, in combination with normal letters like “N”, the “S” is positioned too much to the right (see the left part of the following picture).

NSN NSN

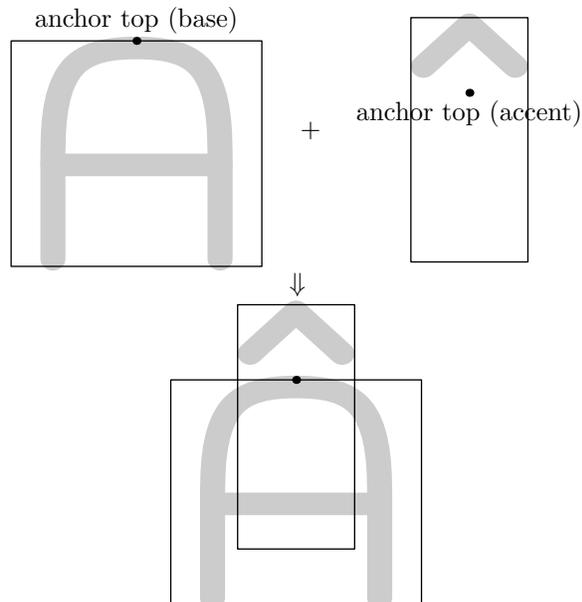
Thus, I shifted the “S” a bit to the left (see the right part of the upper picture) and added corresponding kerning instructions for “OS” and “ST” to keep the spacing of the original logo intact.

### 5 Special techniques

#### 5.1 Anchor pairing with METAFONT

In order to draw accented and other combined characters, it is helpful to use *anchors*. The concept of anchors is common in type design outside of the METAFONT world. However, anchors rarely have been seen in METAFONT up to now.

The idea is easy: Put an anchor at a given point in a base glyph and in the accent glyph; then overlay the two glyphs such that the anchors coincide, producing the pre-composed accented character.



Normally several kinds of anchors are needed. E.g. “Ĉ” and “Ċ” need two different anchors. Fetamont

stores anchors as ordinary points in arrays. Furthermore, the character picture is stored in another array at the end of each character. For combined characters, METAFONT looks at the different arrays and then overlays the base and the accent character using the macro `addto currentpicture`.

#### 5.2 Kerning classes with METAFONT

Like anchor pairing, the concept of kerning classes is widely known but not frequently used in METAFONT. The reason for this is that METAFONT cannot natively write kernings for multiple characters at once. Hence, multiple kerning information has to be cached in arrays.

Let me illustrate the general idea of this caching with a fictional example:

##### 5.2.1 Define kerning classes

It is clear that “OV” needs the same kerning as “DV”. But beware, “VO” needs a different kerning than “VD”! So generally there are two kinds of kerning classes:

- The *first kerning class* groups glyphs together that share the same shape to the right, like “D” and “O”
- The *second kerning class* groups glyphs together that share the same shape to the left, like “C” and “O”

The first kerning class is stored in an array as follows:

row 0	2			
row 1	3	68 (D)	79 (O)	214 (ö)
row 2	2	86 (V)	87 (W)	

The 0<sup>th</sup> column is reserved for the number of columns (0<sup>th</sup> row) and the number of items in the corresponding row, because there is no straightforward way to determine the length of arrays or subarrays in METAFONT. Each row forms a first kerning class. The characters are stored as codes (for the sake of clarity, they are shown here as letters also).

The storage of the second kerning classes works analogously, in another array:

row 0	2				
row 1	4	67 (C)	79 (O)	80 (Q)	214 (ö)
row 2	2	86 (V)	87 (W)		

##### 5.2.2 Kern the kerning classes

The classes are then kerned with the following commands:

```
addclasskern("D","C",2u#)
addclasskern("D","V",-u#)
addclasskern("V","C",-u#)
```

This kerning information is stored in a large three-dimensional array, which has as many columns as characters:

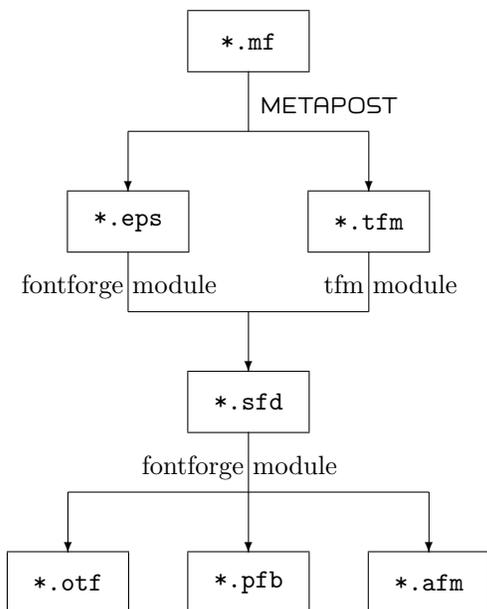
row 68	6	$\binom{67}{2u\#}$	$\binom{79}{2u\#}$	$\binom{80}{2u\#}$	$\binom{214}{2u\#}$	$\binom{86}{-u\#}$	$\binom{87}{-u\#}$
row 79	6	$\binom{67}{2u\#}$	$\binom{79}{2u\#}$	$\binom{80}{2u\#}$	$\binom{214}{2u\#}$	$\binom{86}{-u\#}$	$\binom{87}{-u\#}$
row 86	4	$\binom{67}{-u\#}$	$\binom{79}{-u\#}$	$\binom{80}{-u\#}$	$\binom{214}{-u\#}$		
row 87	4	$\binom{67}{-u\#}$	$\binom{79}{-u\#}$	$\binom{80}{-u\#}$	$\binom{214}{-u\#}$		
row 214	6	$\binom{67}{2u\#}$	$\binom{79}{2u\#}$	$\binom{80}{2u\#}$	$\binom{214}{2u\#}$	$\binom{86}{-u\#}$	$\binom{87}{-u\#}$

### 5.2.3 Write the kerning information

At the very end, the macro `writeligtable` writes all kerning information from the large three-dimensional array, row-wise, in a METAFONT-friendly way.

### 5.3 Producing outlines

The METAFONT sources have been converted to outline font formats like Type 1 or OpenType with a Python script. The script calls METAPOST to produce PostScript files for each glyph. These glyphs are imported by the `fontforge` module. Hosny (2011) previously used this technique to produce the outlines of *Punk Nova*. Because the glyph widths are lost in the import, the `tfm` module from the `mftrace` project is also needed (Nienhuys, 2006).



## 6 History of the logo typeface

- 1979/07/12: Knuth (1979a) shows the first versions of the “Computer Modern” typeface and the METAFONT logo. The graphic below is the result of a conversion from the original “manfnt”

sources (Knuth, 1979b), which were written in the obsolete METAFONT78.

### METAFONT

Knuth used quite a thick circular pen. This “manfnt” also contains 8 pt, 9 pt and title versions of the logo typeface. However, the title font is just a magnified version of the 10 pt font.

- 1984/05/27: The sources of the logo font are rewritten for the new METAFONT84 (Knuth, 1984a). The pen has become elliptic and thinner.
- 1984/09/09: Second try for the new METAFONT84 (Knuth, 1984b). The characters “E” and “F” have rounded vertices.

### METAFONT

- 1985/09/03: Knuth (1985e) defines some “crazy shapes”. He then (Knuth, 1986) uses them to demonstrate randomized typefaces.

### METAFONT METAFONT

- 1985/09/22: The logo typeface gets a slanted variant (Knuth, 1985b), a backslanted skinny bold variant (Knuth, 1985f) and an ultrawide light variant (Knuth, 1985d).



The shapes of the letters A, E, F, M, N, O, T have reached their final state (Knuth, 1985c and Knuth, 1985a).

### METAFONT

- 1985/10/06: Knuth (1985g) uses a logo variant for titles along with *Computer Modern Sans Serif Demibold Condensed 40* for the title pages in Knuth (1986).

### METAFONT

- 1986/01/07: Knuth (1986) specifies a boldface variant of the METAFONT logo. This variant goes well with *Computer Modern Sans Serif Bold*:

### SansMETA

- 1989/04/22: Knuth (1989) shows a new special weight to go with Pandora (see Billawala, 1989).

### Pandora METAFONT

- 1989/06/24: Cugley (1989) extends the logo font to cover the whole uppercase alphabet and a couple of punctuation characters in the so-called “mf” font.

### DAMIAN CUGLEY

- 1992/01/16: Knuth (1992a) adds a demibold variant. This variant is needed for the title “Excerpts from the Programs for T<sub>E</sub>X and METAFONT” (Knuth, 1992b), which combines *Computer Modern Bold Extended* with the logo font.

## T<sub>E</sub>X and METAFONT

- 1993/03/23: Knuth (1993a) adds the characters “P” and “S” to the logo font such that one can typeset “METAPOST” with it. Hobby (2009) states that both of the following logos are okay:

## METAPOST MetaPost

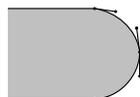
- 1997/04/20: Knuth (1993b) changes the shape of the “S”. “It now sort of assumes that a ‘T’ will follow” (Beeton, 1998).



- 1997/09/30: The American Mathematical Society provides Type 1 versions of the logo font in the following styles: `logo8`, `logo9`, `logo10`, `logobf10`, `logos110` (AMS, 2009). The “P” and the “S” are not included and the widths of the supplied glyphs are often wrongly rounded.



- 1999/6/03: Taco Hoekwater releases new Type 1 versions of the logo font (Hoekwater, 1999). The conversion has been done in MetaFog, which is only available with T<sub>R</sub>U<sub>E</sub>T<sub>E</sub>X. The “S” still has its old shape. The round endings are sometimes suboptimal (e.g. the “F” from *Logo 10*) but all in all, the conversion is very clean.



- 2001/03/04: Taco Hoekwater presents *Elogo*, an extended version of the logo font, which covers the 7-bit T<sub>E</sub>X text encoding (Hoekwater, 2001). The font has been used in some of Hoekwater’s presentation slides (e.g. the following image is extracted from Hoekwater, 2007). The “S” still has the old shape.

## DYNAMIC

- 2001/09/26: At EuroT<sub>E</sub>X 2001 the METATYPE1 logo is shown in the presentation of Jackowski,

Nowacki, and Strzelczyk (2001). The newly designed characters “Y” and “1” are different to the “Y” and “1” in *Elogo*.

## METATYPE1

Funnily, the EuroT<sub>E</sub>X 2001 conference logo also embeds an extended logo font (Pepping, 2001).



- 2011/06/02: For the documentation of another typeface, I wanted to write “mf2pt1” in the logo font, because I was heavily relying on this program back then. Having realised that there were other tools related to METAFONT that could not be written in the logo font, I started extending the logo font.

## MF2PT1 MFLUA METAFOG

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