

The font name mess

Keywords

ConTeXt mkiv, luatex, font names

Introduction

When T_EX came around it shipped with its own fonts. At that moment the T_EX font universe was a small and well known territory. The ‘only’ hassle was that one needed to make sure that the right kind of bitmap was available for the printer.

When other languages than English came into the picture things became more complex as now fonts instances in specific encodings showed up. After a couple of years the by then standardised T_EX distributions carried tens of thousands of font files. The reason for this was simple: T_EX fonts could only have 256 characters and therefore there were quite some encodings. Also, large cjk fonts could easily have hundreds of metric files per font. Distributions also provide metrics for commercial fonts although I could never use them and as a result have many extra metric files in my personal trees (generated by T_EXfont). (Distributions like T_EXLive have between 50.000 and 100.000 files, but derivatives like the ConT_EXt minimal are much smaller.)

At the input side many problems related to encodings were solved by Unicode. So, when the more Unicode aware fonts showed up, it looked like things would become easier. For instance, no longer were choices for encodings needed. Instead one had to choose features and enable languages and scripts and so the problem of the multitude of files was replaced by the necessity to know what some font actually provides. But still, for the average user it can be seen as an improvement.

A rather persistent problem remained, especially for those who want to use different fonts and or need to install fonts on the system that come from elsewhere (either free or commercial): the names used for fonts. You may argue that modern T_EX engines and macro packages can make things easier, especially as one can call up fonts by their names instead of their file names, but actually the problem has worsened. With traditional T_EX you definitely get an error when you mistype a file name or call for a font that is not on your system. The more modern T_EX's macro packages can provide fall-back mechanisms and you can end up with something you didn't ask for.

For years one of the good things of T_EX was its stability. If we forget about changes in content, macro packages and/or hyphenation patterns, documents could render more or less the same for years. This is because fonts didn't change. However, now that fonts are more complex, bugs gets fixed and thereby results can differ. Or, if you use platform fonts, your updated operating system might have new or even different variants. Or, if you access your fonts by font name, a lookup can resolve differently.

The main reason for this is that font names as well as file names of fonts are highly inconsistent across vendors, within vendors and platforms. As we have to deal with this matter, in MkIV we have several ways to address a font: by file name, by font name, and by specification. In the next sections I will describe all three.

Method 1: file

The most robust way to specify what fonts is to be used is the file name. This is done as follows:

```
\definefont[SomeFont][file:Immono10-regular]
```

A file name lookup is case insensitive and the name you pass is exact. Of course the file: prefix (as with any prefix) can be used in font synonyms as well. You may add a suffix, so this is also valid:

```
\definefont[SomeFont][file:lmmono10-regular.otf]
```

By default ConT_EXt will first look for an OpenType font so in both cases you will get such a font. But how do you know what the file name is? You can for instance check it out with:

```
mtxrun --script font --list --method=file --pattern="lm*mono" --all
```

This reports some information about the file, like the weight, style, width, font name, file name and optionally the subfont id and a mismatch between the analysed weight and the one mentioned by the font.

latinmodernmonolight	light	normal	normal	lmmonolt10regular	lmmonolt10-regular.otf
latinmodernmonoproplight	light	italic	normal	lmmonoproplt10oblique	lmmonoproplt10-oblique.otf
latinmodernmono	normal	normal	normal	lmmono9regular	lmmono9-regular.otf
latinmodernmonoprop	normal	italic	normal	lmmonoprop10oblique	lmmonoprop10-oblique.otf
latinmodernmono	normal	italic	normal	lmmono10italic	lmmono10-italic.otf
latinmodernmono	normal	normal	normal	lmmono8regular	lmmono8-regular.otf
latinmodernmonolightcond	light	italic	condensed	lmmonoltcond10oblique	lmmonoltcond10-oblique.otf
latinmodernmonolight	light	italic	normal	lmmonolt10oblique	lmmonolt10-oblique.otf
latinmodernmonolightcond	light	normal	condensed	lmmonoltcond10regular	lmmonoltcond10-regular.otf
latinmodernmonolight	bold	italic	normal	lmmonolt10boldoblique	lmmonolt10-boldoblique.otf
latinmodernmonocaps	normal	italic	normal	lmmonocaps10oblique	lmmonocaps10-oblique.otf
latinmodernmonoproplight	bold	italic	normal	lmmonoproplt10boldoblique	lmmonoproplt10-boldoblique.otf
latinmodernmonolight	bold	normal	normal	lmmonolt10bold	lmmonolt10-bold.otf
latinmodernmonoproplight	bold	normal	normal	lmmonoproplt10bold	lmmonoproplt10-bold.otf
latinmodernmonoslanted	normal	normal	normal	lmmonoslant10regular	lmmonoslant10-regular.otf
latinmodernmono	normal	normal	normal	lmmono12regular	lmmono12-regular.otf
latinmodernmonocaps	normal	normal	normal	lmmonocaps10regular	lmmonocaps10-regular.otf
latinmodernmonoprop	normal	normal	normal	lmmonoprop10regular	lmmonoprop10-regular.otf
latinmodernmono	normal	normal	normal	lmmono10regular	lmmono10-regular.otf
latinmodernmonoproplight	light	normal	normal	lmmonoproplt10regular	lmmonoproplt10-regular.otf

Method 2: name

Instead of lookup by file, you can also use names. In the font database we store references to the font name and full name as well as some composed names from information that comes with the font. This permits rather liberal naming and the main reason is that we can more easily look up fonts. In practice you will use names that are as close to the file name as possible.

```
mtxrun --script font --list --method=name --pattern="lmmono*regular" --all
```

This gives on my machine:

lmmono10regular	lmmono10regular	lmmono10-regular.otf
lmmono12regular	lmmono12regular	lmmono12-regular.otf
lmmono8regular	lmmono8regular	lmmono8-regular.otf
lmmono9regular	lmmono9regular	lmmono9-regular.otf
lmmonocaps10regular	lmmonocaps10regular	lmmonocaps10-regular.otf
lmmonolt10regular	lmmonolt10regular	lmmonolt10-regular.otf

```

lmmonoltcond10regular    lmmonoltcond10regular    lmmonoltcond10-regular.otf
lmmonoprop10regular      lmmonoprop10regular      lmmonoprop10-regular.otf
lmmonoproplt10regular    lmmonoproplt10regular    lmmonoproplt10-regular.otf
lmmonoslant10regular     lmmonoslant10regular     lmmonoslant10-regular.otf

```

It does not show from this list but with name lookups first OpenType fonts are checked and then Type1. In this case there are Type1 variants as well but they are ignored. Fonts are registered under all names that make sense and can be derived from their description. So:

```
mtxrun --script font --list --method=name --pattern="latinmodern*mono" --all
```

will give:

```

latinmodernmono          lmmono9regular           lmmono9-regular.otf
latinmodernmonocaps      lmmonocaps10oblique     lmmonocaps10-oblique.otf
latinmodernmonocapsitalic  lmmonocaps10oblique     lmmonocaps10-oblique.otf
latinmodernmonocapsnormal  lmmonocaps10oblique     lmmonocaps10-oblique.otf
latinmodernmonolight     lmmonolt10regular       lmmonolt10-regular.otf
latinmodernmonolightbold  lmmonolt10boldoblique   lmmonolt10-boldoblique.otf
latinmodernmonolightbolditalic  lmmonolt10boldoblique   lmmonolt10-boldoblique.otf
latinmodernmonolightcond  lmmonoltcond10oblique   lmmonoltcond10-oblique.otf
latinmodernmonolightconditalic  lmmonoltcond10oblique   lmmonoltcond10-oblique.otf
latinmodernmonolightcondlight  lmmonoltcond10oblique   lmmonoltcond10-oblique.otf
latinmodernmonolighttitalic  lmmonolt10oblique       lmmonolt10-oblique.otf
latinmodernmonolightlight  lmmonolt10regular       lmmonolt10-regular.otf
latinmodernmononormal    lmmono9regular          lmmono9-regular.otf
latinmodernmonoprop      lmmonoprop10oblique     lmmonoprop10-oblique.otf
latinmodernmonopropitalic  lmmonoprop10oblique     lmmonoprop10-oblique.otf
latinmodernmonoproplight  lmmonoproplt10oblique   lmmonoproplt10-oblique.otf
latinmodernmonoproplightbold  lmmonoproplt10boldoblique   lmmonoproplt10-boldoblique.otf
latinmodernmonoproplightbolditalic  lmmonoproplt10boldoblique   lmmonoproplt10-boldoblique.otf
latinmodernmonoproplighttitalic  lmmonoproplt10oblique   lmmonoproplt10-oblique.otf
latinmodernmonoproplightlight  lmmonoproplt10oblique   lmmonoproplt10-oblique.otf
latinmodernmonoproprnormal  lmmonoprop10oblique     lmmonoprop10-oblique.otf
latinmodernmonoslanted    lmmonoslant10regular     lmmonoslant10-regular.otf
latinmodernmonoslantednormal  lmmonoslant10regular     lmmonoslant10-regular.otf

```

Watch the 9 point version in this list. It happens that there are 9, 10 and 12 point regular variants but all those extras come in 10 point only. So we get a mix and if you want a specific design size you really have to be more specific. Because one font can be registered with its font name, full name etc. it can show up more than once in the list. You get what you ask for.

With this obscurity you might wonder why names make sense as lookups. One advantage is that you can forget about special characters. Also, Latin Modern with its design sizes is probably the worst case. So, although for most fonts a name like the following will work, for Latin Modern it gives one of the design sizes:

```
\definefont[SomeFont][name:latinmodernmonolightbolditalic]
```

But this is quite okay:

```
\definefont[SomeFont][name:lmmonolt10boldoblique]
```

So, in practice this method will work out as well as the file method but you can best check if you get what you want.

Method 3: spec

We have now arrived at the third method, selecting by means of a specification. This time we take the family name as starting point (although we have some fall-back mechanisms):

```
\definefont[SomeSerif]          [spec:times]
\definefont[SomeSerifBold]      [spec:times-bold]
\definefont[SomeSerifItalic]    [spec:times-italic]
\definefont[SomeSerifBoldItalic][spec:times-bold-italic]
```

The patterns are of the form:

```
spec:name-weight-style-width
spec:name-weight-style
spec:name-style
```

When only the name is used, it actually boils down to:

```
spec:name-normal-normal-normal
```

So, this is also valid:

```
spec:name-normal-italic-normal
spec:name-normal-normal-condensed
```

Again we can consult the database:

```
mtxrun --script font --list --method=spec lmmmono-normal-italic --all
```

This prints the following list. The first column is the family name, the fifth column the font name:

latinmodernmono	normal	italic	normal	lmmmono10italic	lmmmono10-italic.otf
latinmodernmonoprop	normal	italic	normal	lmmmonoprop10oblique	lmmmonoprop10-oblique.otf
lmmmono10	normal	italic	normal	lmmmono10italic	lmtti10.afm
lmmmonoprop10	normal	italic	normal	lmmmonoprop10oblique	lmttto10.afm
lmmmonocaps10	normal	italic	normal	lmmmonocaps10oblique	lmtcso10.afm
latinmodernmonocaps	normal	italic	normal	lmmmonocaps10oblique	lmmmonocaps10-oblique.otf

Watch the OpenType and Type1 mix. As we're just investigating here, the lookup looks at the font name and not at the family name. At the \TeX end you use the family name:

```
\definefont[SomeFont][spec:latinmodernmono-normal-italic-normal]
```

So, we have the following ways to access this font:

```
\definefont[SomeFont][file:lmmmono10-italic]
\definefont[SomeFont][file:lmmmono10-italic.otf]
\definefont[SomeFont][name:lmmmono10italic]
\definefont[SomeFont][spec:latinmodernmono-normal-italic-normal]
```

As OpenType fonts are preferred over Type1 there is not much chance of a mix-up.

As mentioned in the introduction, qualifications are somewhat inconsistent. Among the weight we find: black, bol, bold, demi, demibold, extrabold, heavy, light, medium, mediumbold, regular, semi, semibold, ultra, ultrabold and ultralight. Styles are: ita, ital, italic, roman, regular, reverseoblique, oblique and slanted. Examples of width are: book, cond, condensed, expanded, normal and thin. Finally we have alternatives which can be anything.

When doing a lookup, some normalizations takes place, with the default always being 'normal'. But still the repertoire is large:

helveticaneue medium	normal normal	helveticaneuemedium	HelveticaNeue.ttc index: 0
helveticaneue bold	normal condensed	helveticaneuecondensedbold	HelveticaNeue.ttc index: 1
helveticaneue black	normal condensed	helveticaneuecondensedblack	HelveticaNeue.ttc index: 2
helveticaneue ultralight	italic thin	helveticaneueultralightitalic	HelveticaNeue.ttc index: 3
helveticaneue ultralight	normal thin	helveticaneueultralight	HelveticaNeue.ttc index: 4
helveticaneue light	italic normal	helveticaneuelightitalic	HelveticaNeue.ttc index: 5
helveticaneue light	normal normal	helveticaneuelight	HelveticaNeue.ttc index: 6
helveticaneue bold	italic normal	helveticaneuebolditalic	HelveticaNeue.ttc index: 7
helveticaneue normal	italic normal	helveticaneueitalic	HelveticaNeue.ttc index: 8
helveticaneue bold	normal normal	helveticaneuebold	HelveticaNeue.ttc index: 9
helveticaneue normal	normal normal	helveticaneue	HelveticaNeue.ttc index: 10
helveticaneue normal	normal condensed	helveticaneuecondensed	hlc____.afm conflict: roman
helveticaneue bold	normal condensed	helveticaneueboldcond	hlbc____.afm
helveticaneue black	normal normal	helveticaneueblackcond	hlzc____.afm conflict: normal
helveticaneue black	normal normal	helveticaneueblack	hlbl____.afm conflict: normal
helveticaneue normal	normal normal	helveticaneueroman	lt_50259.afm conflict: regular

The font database

In MkIV we use a rather extensive font database which in addition to bare information also contains a couple of hashes. When you use ConTeXt MkIV and install a new font, you have to regenerate the file database. In a next \TeX run this will trigger a reload of the font database. Of course you can also force a reload with:

```
mtxrun --script font --reload
```

As a summary we mention a few of the discussed calls of this script:

```
mtxrun --script font --list somename (== --pattern=*somename*)
```

```
mtxrun --script font --list --method=name somename
```

```
mtxrun --script font --list --method=name --pattern=*somename*
```

```
mtxrun --script font --list --method=spec somename
```

```
mtxrun --script font --list --method=spec somename-bold-italic
```

```
mtxrun --script font --list --method=spec --pattern=*somename*
```

```
mtxrun --script font --list --method=spec --filter="fontname=somename"
```

```
mtxrun --script font --list --method=spec
```

```
    --filter="familyname=somename,weight=bold,style=italic,width=condensed"
```

```
mtxrun --script font --list --method=file somename
```

```
mtxrun --script font --list --method=file --pattern=*somename*
```

The lists shown in before depend on what fonts are installed and their version. They might not reflect reality at the time you read this.

Interfacing

Regular users never deal with the font database directly. However, if you write font loading macros yourself, you can access the database from the \TeX end. First we show an example of an entry in the database, in this case TeXGyreTermes Regular.

```
{
  designsizes = 100,
  familyname = "texgyretermes",
  filename = "texgyretermes-regular.otf",
  fontname = "texgyretermesregular",
  fontweight = "regular",
  format = "otf",
  fullname = "texgyretermesregular",
  maxsize = 200,
  minsize = 50,
  rawname = "TeXGyreTermes-Regular",
  style = "normal",
  variant = "",
  weight = "normal",
  width = "normal",
}
```

Another example is Helvetica Neue Italic:

```
{
  designsizes = 0,
  familyname = "helveticaneue",
  filename = "HelveticaNeue.ttc",
  fontname = "helveticaneueitalic",
  fontweight = "book",
  format = "ttc",
  fullname = "helveticaneueitalic",
  maxsize = 0,
  minsize = 0,
  rawname = "Helvetica Neue Italic",
  style = "italic",
  subfont = 8,
  variant = "",
  weight = "normal",
  width = "normal",
}
```

As you can see, some fields can be meaningless, like the sizes. As using the low level \TeX interface assumes some knowledge, we stick here to an example:

```
\def\TestLookup#1%
{\dlookupfontbyspec{#1}
 pattern: #1, found: \dlookupnoffound
 \blank
 \dorecurse {\dlookupnoffound} {%
 \recurselevel:~\dlookupgetkeyofindex{fontname}{\recurselevel}%
```

```
\quad  
}%  
\blank}  
  
\TestLookup{familyname=helveticaneue}  
\TestLookup{familyname=helveticaneue,weight=bold}  
\TestLookup{familyname=helveticaneue,weight=bold,style=italic}
```

You can use the following commands:

```
\dlookupfontbyspec {key=value list}  
\dlookupnofound  
\dlookupgetkeyofindex {key}{index}  
\dlookupgetkey {key}
```

First you do a lookup. After that there can be one or more matches and you can access the fields of each match. What you do with the information is up to yourself.

A few remarks

The fact that modern \TeX engines can access system fonts is promoted as a virtue. The previous sections demonstrated that in practice this does not really free us from a name mess. Of course, when we use a really small \TeX tree, and system fonts only, there is not much that can go wrong, but when you have extra fonts installed there can be clashes.

We're better off with file names than we were in former times when operating systems and media forced distributors to stick to 8 characters in file names. But that does not guarantee that today's shipments are more consistent. And as there are still some limitations in the length of font names, obscure names will be with us for a long time to come.

Hans Hagen