Type Design with FontLab® and “the most important Operating System”
“The most important Operating System” pays tribute to Bill Hill for his document *OSPREY, The Magic of Reading* and his 2004 video online at MSDN Channel9 titled *Windows is not the most important OS* in which he comes to a very important conclusion:

We all use the same OS in the end: *Homo Sapiens 1.0*

In this respect, type design and the mysterious state referred to as *readability* entirely depends on pattern recognition, i.e., the key to the development of language – especially writing and reading systems.
Indeed, etymologically, font is female, from French “fonté,” “melting”—hence la font, la police, &c.
Indeed, etymologically, font is *female*, from French “fonté,” “melting” – hence *la font, la police, &c.*
Types are:
1. the parts of the font
2. executive drawings &/or design drawings — in short “characters” are drawn or inked, “fonts” are licensed and used (i.e. sold, hence ethics, &c.).
Contours (outlines) are of two kinds: white or black. A contour is a closed path.

Directed contour

Filled interior zone

Control Point

Bézier Curve

End Point

Control Vector

End Point

Smooth connection

Sharp connection
The Metric data of a glyph are Cartesian information (x-y).

```
.afm
Adobe Font Metrics, ASCII text-based font format.
```

```
.pfm
For Windows systems a .pfm file carries the metrics.
```

- **Character width**
- **Right margin**
- **Baseline**
- **Left sidebearing**
- **Right sidebearing**
- **Origin point**
The coordinates of every object in a font are represented by a standard measurement system:

The font-unit is equal to \(\frac{1}{1000}\) of the height of the body of the font, i.e., the ‘eM’ square.

Usually, the height of a roman upper case is 700 units. *The height of the font is used as a value/parameter when scaling the types in the desired sizes.*
Hinting, more accurately called *instructing*, is a method of specifying how digital fonts display at small sizes on low-resolution devices, usually for on-screen usage. This is accomplished by providing instructions in the font file that define which pixels are turned on when producing bitmap images.

All the structural strokes in a character (*glyph*) are declared by Hint instructions: a pair of horizontal & vertical lines, plus the width of the Hint.
Type Design with FontLab® and “the most important Operating System”
PostScript (ps)

page description language (PDL)

(1976) 1985 – John Warnock

1. Device-independent description: high-level imaging model.
2. Raster output device software (interpret/render)

—Computer display, low resolution, from 50 to 216 pixels;
—Dot-matrix printers, from 100 to 250 dots per inch;
—Ink-jet and Laser printers, from 300 to 1400 dpi;
—Photographic technologies, 2400 dpi and above.
<table>
<thead>
<tr>
<th>Year</th>
<th>Font Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>Bitmap</td>
<td>Dot-matrix – one file, one body (size).</td>
</tr>
<tr>
<td>1984</td>
<td>T1</td>
<td>3° grade Bézier, PostScript interpreter.</td>
</tr>
<tr>
<td>1990</td>
<td>MM</td>
<td>Interpolation – weight, width, style, body.</td>
</tr>
<tr>
<td>1996</td>
<td>OT</td>
<td>Unicode, 16 Bit (65,000 glyphs), + platform.</td>
</tr>
<tr>
<td>2009</td>
<td>Webfont</td>
<td>Delivering on the fly; saved as a compressed container, supports licensing information, referenced within CSS by the <code>@font-face</code> rule.</td>
</tr>
</tbody>
</table>
1976 **Bitmap**
.bmp

1984 **T1**
.pfb

1990 **MM**
.mmf

1991 **TT**
.ttf

1996 **OT**
.ttf – .otf

2009 **WOFF**
.woff

**Xerox** On-screen visualization of printing types

**Adobe** (*ATM, Apple Laser Writer, PageMaker, DTP*)

**SCALING INTELLIGENCE SUPPORTED AT OPERATING SYSTEM LEVEL:**

**Adobe**

- **T1+**, weight/width/optical-size/style axes, &c.

**Apple & Microsoft**

- Standard, laser, no film-units.
- Multilingual, only one font file.

**WebFonts Working Group**

- www.w3.org/Fonts/WG

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Impossible to convert from TT to T1 without accuracy loss.

T1 = 3° grade Bézier curves

TT = subset, 2° grade equations

Uppercase Roman ‘O’ drawn by PostScript T1 splines... and by TrueType curves.

Bitmapped
Vector
Outline
**PostScript** uses “dumb” fonts and a “smart” interpreter.

**TrueType** uses relatively smarter fonts and a dumber interpreter.

Most of the high-res output devices use PostScript as page description language; *PostScript fonts* can be sent directly to those devices. PostScript hints tell the rasterizer what features ought to be controlled, and the rasterizer interprets these using its own “intelligence.”

*TrueType fonts* are downloaded as bitmap or they require the rasterizer to be downloaded as a PostScript program, with a consequent slow down of the printing process. TrueType puts very specific instructions into the font to control how it will appear.
Unicode consists of a repertoire of more than 109,000 characters covering 93 scripts; a set of code charts for visual reference, an encoding methodology and set of standard character encodings, an enumeration of character properties. One number, one character—language, application and platform independent.
OpenType

16-bit cross platform font format

*OpenType* is a cross platform format for scalable computer fonts originally built on its predecessor TrueType, retaining the 8-bit TrueType’s basic structure and adding many intricate data structures for prescribing typographic behaviors that enhance the font’s typographic and language support capabilities.

The extended support via Unicode allows OpenType fonts to have up to 65,536 glyphs and cover all languages and scripts admitted.
Typical dictionary of the structure of a PostScript font program:

```
Typical dictionary of the structure of a PostScript font program:

font dictionary
  /FontInfo dictionary
    /version string
    /Notice string
    /FullName string
    /FamilyName string
    /Weight string
    /ItalicAngle number
    /isFixedPitch boolean
    /UnderlinePosition number
    /UnderlineThickness number
  /Private dictionary
    /RD procedur
    /ND procedur
    /NP procedur
    /Subrs arra
    /OtherSubrs arra
    /UniqueID integer
    /BlueValues arra
    /OtherBlues arra
    /FamilyBlues arra
    /FamilyOtherBlues arra
    /BlueScale number
    /BlueShift integer
    /BlueFuzz integer
    /StdHW arra
    /StdVW arra
    /StemSnapH arra
    /StemSnapV arra
    /ForceBold boolean
    /LanguageGroup integer
    /password integer
    /lenIV integer
    /MinFeature arra
    /RndStemUp boolean
/

/CharStrings dictionary
  /A charstring
  /B charstring
  .notdef charstring
```
<table>
<thead>
<tr>
<th>Font Browsers</th>
<th>Ergonis PopChar — <strong>MAC, PC</strong></th>
<th>ergonis.com</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lemke FontBook — <strong>MAC</strong></td>
<td>lemkesoft.de</td>
</tr>
<tr>
<td></td>
<td>Neuber Typograf — <strong>PC</strong></td>
<td>neuber.com</td>
</tr>
<tr>
<td></td>
<td>AMP Font Viewer — <strong>PC</strong></td>
<td>ampsoft.net</td>
</tr>
<tr>
<td></td>
<td>Wordmark.it — <strong>ONLINE</strong></td>
<td>wordmark.it</td>
</tr>
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<tr>
<th>Font Managers</th>
<th>Insider FontAgent — <strong>MAC</strong></th>
<th>fontagent.com</th>
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<tr>
<td></td>
<td>Linotype FontExplorerX — <strong>MAC, PC</strong></td>
<td>fontexplorerx.com</td>
</tr>
<tr>
<td></td>
<td>Extensis Suitcase — <strong>MAC, PC</strong></td>
<td>extensis.com</td>
</tr>
<tr>
<td></td>
<td>Proxima FontExpert — <strong>PC</strong></td>
<td>proximasoftware.com</td>
</tr>
<tr>
<td></td>
<td>High-Logic MainType — <strong>PC</strong></td>
<td>high-logic.com</td>
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<th>Font Editors</th>
<th>FontLab, Fontographer — <strong>MAC, PC</strong></th>
<th>fontlab.com</th>
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<td></td>
<td>FontForge — <strong>MAC, PC, LINUX</strong></td>
<td>fontforge.net</td>
</tr>
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<td>Glyphs — <strong>MAC</strong></td>
<td>glyphsapp.com</td>
</tr>
<tr>
<td></td>
<td>Fontstruct — <strong>ONLINE</strong></td>
<td>fontstruct.com</td>
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Low Quality means:

1. Incomplete set of characters.
2. Inconsistency in the weight of the stems.
3. Irregular and/or improper outline construction.
4. An excess of points to describe a glyph.
5. Unsuitable and/or inaccurate hinting.
6. Inconsistently designed metric.
7. Poor, excessive, or inexistent kerning.
8. Other editing/legibility factors.
High Quality *means that*...

the essential elements of style have more to do with the goals typographers set for themselves than with the mutable eccentricity of their tools. ¶ In other words, typography itself is far more device-independent than PostScript – the computer language used to render these particular constructed letters, and the design of these pages, into typographic code.

Writing systems vary, *but a good page is not hard to learn to recognize*, whether it comes from Táng Dynasty China, the Egyptian New Kingdom or Renaissance Italy. Typography is the craft of establishing human language with a durable form.
Hamburgefonstiv
ABCDEF abcdefgh
GHIJKL ijklnop
MNOPQ qrsβtuvw
RSTUV xyz*[(__)]
WXYZ& ,,.;/!?><
012345
6789
---""""""
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