GNU Unifont

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```
GNU Unifont
Aa Bb Cc Dd Ee Ff Gg
Hh Ii Jj Kk Ll Mm Nn
Oo Pp Qq Rr Ss Tt Uu
Vv Ww Xx Yy Zz
1 2 3 4 5 6 7 8 9 0
! @ # $ % ^ & * ( )
; : ' " ? [ ] { } + =
```

Category	Unicode, Monospace, Bitmap
Designer(s)	Roman Czyborra, Paul Hardy
Date created	1998
Date released	7 September 2008
License	GNU General Public License
See all characters	

The **GNU Unifont** by Roman Czyborra is a free bitmap font that covers the Unicode Basic Multilingual Plane (BMP), using an intermediate bitmapped font format. It is present in most free operating systems and windowing systems such as Linux, XFree86 or the X.Org Server and some minor embedded devices like cell phones or microcontrollers[1]. The font is released under the GNU General Public License.

Status

The Unicode Basic Multilingual Plane covers 2^{16} = 65,536 code points. Of this number, 2048 are reserved for special use as surrogate pairs and 6,400 are reserved for private use. This leaves approximately 57,000 code points to which glyphs can be assigned. Some of these code points are special values that do not have an assigned glyph, but most do have assigned glyphs.

As of June 2008, the GNU Unifont has complete coverage of the Basic Multilingual Plane as defined in Unicode 5.1. Scripts that are less than 100% complete can be augmented by any contributor.

The .hex font format

The GNU Unifont .hex format defines its glyphs as either 8 or 16 pixels in width by 16 pixels in height. Most Western script glyphs can be defined as 8 pixels wide, while other glyphs (notably the Chinese-Japanese-Korean, or CJK set) are typically defined as 16 pixels wide.

The unifont.hex file contains one line for each glyph. Each line consists of a four digit Unicode hexadecimal code point, a colon, and the bitmap string. The bit string is 32 hexadecimal digits for an 8 pixel wide glyph or 64 hexadecimal digits for a 16 pixel wide glyph.

A '1' bit in the bit string corresponds to an 'on' pixel. Pixels bits are stored top to bottom, left to right.

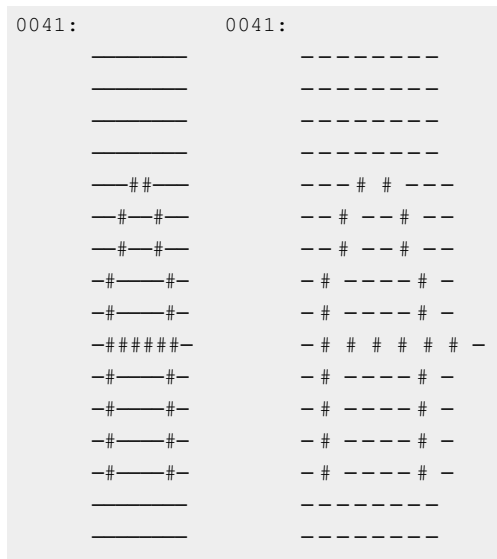The font is then converted into a BDF file for use on X11.

Example

This is an example font containing one glyph, for ASCII capital 'A'.

```
0041:0000000018242442427E424242420000
```

The first number is the hexadecimal Unicode code point, with range 0000 through FFFF. Hexadecimal 0041 is decimal 65, the code point for the letter 'A'. The colon separates the code point from the bitmap. In this example, the glyph is 8 pixels wide, so the bit string is 32 hexadecimal digits long.

The bit string begins with 8 zeros, so the top 4 rows will be empty (2 hexadecimal digits per 8 bit byte, with 8 bits per row for an 8 pixel-wide glyph). The bit string also ends with 4 zeros, so the bottom 2 rows will be empty. It is implicit from this that the default font descender is 2 rows below the baseline, and the capital height is 10 rows above the baseline. This is the case in the GNU Unifont with Latin glyphs.

The hexdraw Perl script produces the following output from the one line glyph definition above (at right the same output, spaced out for better visualization):

```
0041:              0041:
————————            - - - - - - - -
————————            - - - - - - - -
————————            - - - - - - - -
————————            - - - - - - - -
——##——              - - - # # - - -
—#——#—              - - # - - # - -
—#——#—              - - # - - # - -
–#————#-            - # - - - - # -
–#————#-            - # - - - - # -
–######–            - # # # # # # –
–#————#-            - # - - - - # -
–#————#-            - # - - - - # -
–#————#-            - # - - - - # -
–#————#-            - # - - - - # -
————————            - - - - - - - -
————————            - - - - - - - -
```

This can be edited in a text editor, then converted back into a hex string with the same utility. The goal was to create an intermediate format that would facilitate adding new glyphs.

Vectorization

The font has subsequently been vectorized and converted to TrueType format,[2] [3] and merged back the improvements to 20,000 CJK glyphs done by WenQuanYi's Unibit font.[4]

References

[1] http://code.google.com/p/u8glib/wiki/fontgroupunifont

[2] *GNU Unifont in TrueType format* (http://www.lgm.cl/trabajos/unifont/index.en.html),

[3] *Debian packages - TrueType version of the GNU Unifont - ttf-unifont* (http://packages.debian.org/sid/ttf-unifont), SPI Inc., , retrieved 2010-08-03

[4] *Wen Quan Yi: Spring of Letters* (http://unifoundry.com/unifont.html),

• The Unicode Consortium: *The Unicode 5.0 Standard*. 5th, Addison Wesley 2007; ISBN 0-321-48091-0.

External links

• Roman Czyborra's GNU Unifont page (http://czyborra.com/unifont/)

• Unifoundry.com GNU Unifont page (http://unifoundry.com/unifont.html)

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