

Braille fonts in Project Fandol

Clerk Ma

1 A short history

In China, Braille symbols were first introduced in 1874 by William Hill Murray, a preacher of the National Bible Society of Scotland. Collaborating with J. Crossette, Murray developed a system which can encode Braille with 408 different syllables in Mandarin Chinese. The shortcoming of Murray's system is that all the syllables are based on the Peking dialect of the Chinese language. This system cannot work properly for other dialects in North China. David Hill, a preacher of Wesleyan Methodist Missionary Society, developed another encoding system during 1888–1889. Hill's system influenced various Chinese Braille encoding systems in the 20th century. The current Braille encoding scheme used in mainland China was designed by Huang Nai (黄乃) in 1952.

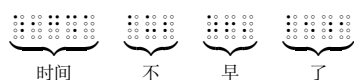
After the First Opium War, many preachers landed in China to do missionary work. The teaching of Braille was mainly in missionary schools. In 1928, the Braille Literature Association (BLA) was established in China, whose mission was to publish books in Braille. In 1933, a Braille version of John Bunyan's *The Pilgrim's Progress* by BLA became a best-seller among blind people. During the second half of the 20th century, after the foundation of the People's Republic of China, a national press named China Braille Press was established for publishing Braille books in Huang's Braille encoding scheme.

2 Standards for Braille

There are several GB (国家标准, National Standard) standards for Braille usage in China.

GB/T 15720-2008: Chinese Braille.

First published in 1995, revised in 2008. This standard has specified: (1) the form and size of Braille font, (2) the encoding of Braille, (3) hyphenation in Braille. According to this standard, a Braille sentence (meaning *It's getting late*) can be written as:



GB/T 18028-2010: Mathematical, physical and chemical symbols of Chinese Braille.

First published in 1995, revised in 2000 and 2010. This standard has specified the form and usage of mathematical, physical and chemical symbols. Adopting the Marburg and Nemeth systems, people can use Braille to express formulae, as in:

$$x' = f(x, t) \leftrightarrow \begin{matrix} \cdot\cdot\cdot\cdot & \cdot\cdot\cdot\cdot & \cdot\cdot\cdot\cdot & \cdot\cdot\cdot\cdot \\ \cdot\cdot\cdot\cdot & \cdot\cdot\cdot\cdot & \cdot\cdot\cdot\cdot & \cdot\cdot\cdot\cdot \\ \cdot\cdot\cdot\cdot & \cdot\cdot\cdot\cdot & \cdot\cdot\cdot\cdot & \cdot\cdot\cdot\cdot \\ \cdot\cdot\cdot\cdot & \cdot\cdot\cdot\cdot & \cdot\cdot\cdot\cdot & \cdot\cdot\cdot\cdot \end{matrix}$$

3 Fandol's Braille fonts

More and more public facilities are marked with Braille in China. For example, the photo here shows Braille on a handrail:



Figure 1: Braille on handrail

Project Fandol has provided two Braille fonts which are inspired by Braille dots used in Chinese public facilities, and modified with rules from GB/T 15720-2008. All the Braille symbols are encoded in Unicode. The first is `FandolBraille-Display.otf` (fig. 2). Each glyph in this font has eight dots (empty or filled), and is designed for display screen.

The second font is `FandolBraille-Regular.otf` (fig. 3). This font is designed for printing.

4 Notes

- Unicode has a block called *Braille Patterns* (the range from U+2800 to U+28FF) assigned for these Braille glyphs. In fact, Chinese Braille only uses the range from U+2800 to U+283F, but I have no reason to abandon other code points which would be useful to other people in the world.
- The Braille glyphs in the GNU Project's FreeFont package (FreeMono) [4] are designed by Steve White. Braille glyphs in FreeMono conform to the proportions of a US Library of Congress standard [5], which are similar to the proportions in GB standards.
- William Park's `braille` package [6] also can produce Braille with Python scripts. But his implementation does not provide standalone Braille fonts. When using the `braille` package, every dot in every glyph is drawn via L^AT_EX's `\put` command and `picture` environment.
- The picture is taken in a station of the Beijing subway. Other barrier-free structures, such as sidewalks for the blind, have also existed for a long time. These convenient facilities improve the safety of blind people in public.

	'0	'1	'2	'3	'4	'5	'6	'7	
'2400x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"280x
'2401x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"280x
'2402x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"281x
'2403x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"281x
'2404x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"282x
'2405x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"282x
'2406x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"283x
'2407x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"283x
'2410x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"284x
'2411x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"284x
'2412x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"285x
'2413x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"285x
'2414x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"286x
'2415x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"286x
'2416x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"287x
'2417x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"287x
'2420x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"288x
'2421x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"288x
'2422x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"289x
'2423x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"289x
'2424x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Ax
'2425x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Ax
'2426x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Bx
'2427x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Bx
'2430x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Cx
'2431x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Cx
'2432x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Dx
'2433x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Dx
'2434x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Ex
'2435x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Ex
'2436x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Fx
'2437x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Fx
	"8	"9	"A	"B	"C	"D	"E	"F	

Figure 2: Font table of FandolBraille-Display.otf

	'0	'1	'2	'3	'4	'5	'6	'7	
'2400x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"280x
'2401x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"280x
'2402x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"281x
'2403x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"281x
'2404x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"282x
'2405x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"282x
'2406x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"283x
'2407x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"283x
'2410x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"284x
'2411x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"284x
'2412x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"285x
'2413x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"285x
'2414x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"286x
'2415x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"286x
'2416x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"287x
'2417x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"287x
'2420x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"288x
'2421x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"288x
'2422x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"289x
'2423x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"289x
'2424x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Ax
'2425x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Ax
'2426x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Bx
'2427x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Bx
'2430x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Cx
'2431x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Cx
'2432x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Dx
'2433x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Dx
'2434x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Ex
'2435x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Ex
'2436x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Fx
'2437x	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	"28Fx
	"8	"9	"A	"B	"C	"D	"E	"F	

Figure 3: Font table of FandolBraille-Regular.otf

References

- [1] 郭卫东, 基督教新教传教士与中国盲文体系的演进, 近代史研究, 2006 (2)
Guo Weidong, *The Protestant Missionaries and the Development of China's Braille System*, Modern Chinese History Studies, 2006 (2).
- [2] 中华人民共和国国家质量监督检验检疫总局, 中国国家标准化管理委员会, GB/T 15720-2008 中国盲文, 中国标准出版社, 2013
General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China, Standardization Administration of the People's Republic of China, *GB/T 15720-2008: Chinese Braille*, Standards Press of China, 2013.
- [3] 中华人民共和国国家质量监督检验检疫总局, 中国国家标准化管理委员会, GB/T 18028-2010 中国盲文数学、物理、化学符号, 中国标准出版社, 2012
General Administration of Quality Supervision, Inspection and Quarantine of the

- People's Republic of China, Standardization Administration of the People's Republic of China, *GB/T 18028-2010: Mathematical, physical and chemical symbols of Chinese Braille*, Standards Press of China, 2012.
- [4] GNU Project, GNU FreeFont: Braille Patterns, 2013. <http://www.gnu.org/software/freetype/ranges/Braille.html>
- [5] National Library of Congress, National Library Service for the Blind and Physically Handicapped, Specification #800, "Braille Books and Pamphlets", 2008. http://www.loc.gov/nls/specs/800_march5_2008.pdf
- [6] William Park, *braille*—Support for braille, 2010. <http://ctan.org/pkg/braille>

◇ Clerk Ma
clerkma (at) gmail dot com
<http://ctan.org/pkg/fandol>