1. Rendering single line of text.

Unicode string: (UTF-16)

Base direction: TEXT_DIRECTION_AUTO

Text direction is detected based on first encountered code point (AUTO), current locale (LOCALE) or specified by user. Base direction is used to initialize BiDi iterator. Text direction is detected based on first encountered code point (AUTO), current locale (LOCALE) or specified by user. Base direction is used to initialize BiDi iterator.

1.1. Split the string into BiDi and Script runs, then combine attribute/bidi and script runs into monotone runs.

1.1.1. Combine into monotone runs.

Monotone Runs:

Input string code units: 23...23

Output string code units: 24...24

Unicode string: Base direction:

Font:

Language:

1.1.2. Shape runs in the order provided by BiDi algorithm.

HarfBuzz is a text-shaping engine. If you give HarfBuzz a font and a string containing a sequence of Unicode code points, HarfBuzz selects and positions the corresponding glyphs from the font, applying all of the necessary layout rules and font features. HarfBuzz then returns the string to you in the form that is correctly arranged for the language and writing system.

What is HarfBuzz?

ICU BiDi API References

UAX #9: The Bidirectional Algorithm

Character - ambiguous term, can mean anything

Code unit - atomic unit of the encoding (16-bits in case of UTF-16), represent a full code point, or part of a code point

Code point - atomic unit of the Unicode standard (independent of encoding)

Glyph - an image, atomic element of the font (font specific, does not have any meaning outside of the font)

Grapheme cluster - atomic unit of a writing system

1.2.1. Shape runs with fallback font.

1.3. Baseline align, ascent and descent.

Align all runs by baseline

Real baseline is not necessary horizontal

Calculate line ascent and descent, counting all glyph offset

1.4. Draw glyphs left-to-right using advances and offsets of the glyphs.