Implement Bopomofo by OpenType font feature

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What is Bopomofo?

- A phonetic system for Mandarin education in Taiwan.
- Major input method for Han characters.
Layout Rules for Bopomofo

• Bopomofo Ruby - implement and requirement
  W3C ebooks and i18n workshop 2013/6/4

• "The Manual of The Phonetic Symbols of Mandarin Chinese"
  Ministry of Education, Taiwan
HTML Markup

Light tone
<ruby>過<rt>˙ㄍㄨㄛ</rt></ruby>

2nd, 3rd, 4th tone marks
<ruby>醒<rt>ㄒㄧㄥˇ</rt></ruby>

Tabular ruby markup model (Only support by Firefox)
<ruby><rb>你</rb>好<rb>嗎<rt>ㄋㄧˇ<rt>ㄏㄠˇ<rt>˙ㄇㄚ</rt></ruby>

→ HTML Ruby Markup Extensions
CSS Ruby Layout Module

ruby-position: inter-character; is support by Webkit.
## Glyph issue

<table>
<thead>
<tr>
<th>Source Han Sans</th>
<th>U+02D9</th>
<th>DOT ABOVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>U+02CA</td>
<td>MODIFIER LETTER ACUTE ACCENT</td>
<td></td>
</tr>
<tr>
<td>U+02C7</td>
<td>CARON</td>
<td></td>
</tr>
<tr>
<td>U+02CB</td>
<td>MODIFIER LETTER GRAVE ACCENT</td>
<td></td>
</tr>
</tbody>
</table>

Source Han Sans traditional Chinese build fixed the glyphs of tone marks
Last step:
position of tone marks

Tone marks' position when Bopomofo placed on the top
It's ok but not readable for readers
Last step: position of tone marks

Tone marks' position when Bopomofo placed on the right side
2nd, 3rd, 4th tone marks should be placed to right side
OpenType feature?

• Which OpenType feature should we use?
• Should we apply for new feature?
• Do browsers support those features?
Take a try!

Hard to imply with Layout Engine. Try font feature

What OpenType features should be used?

Ask expert for advice. (thanks Dr. Ken Lunde @Adobe)

Let's make a sample font for a try! (thanks @butitaiwan)

Do browsers support those "never-used" features?

Browser's bug confirmed

harfbuzz OpenType engine bug fixed. Now works on Firefox, Chrome and LibreOffice.
Almost done

我起來了

天天早起，太陽也起得早。我

天天早起，太陽也起來了。我起

天亮了，我起來了。太

起來了我天天早起太陽

起得早我天天早起太陽也

天亮了我起來了太陽也起來了我起得早太陽

也起得早我天天早起太陽也天天早起
Bopomofo for Dialect

• The requirement is raised by WikiMedia Community in Taiwan.
• The font solution fully support it.
• We sent a proposal to ISO/IEC JTC1 SC2/WG2 to add a missed tone mark and replace sample glyphs for Bopomofo block.
Font specification

• For horizontal writing, Light Tone is a middle dot in proper width.
• 2nd, 3rd, 4th tone marks use `ruby` to adjust height.
• For vertical writing, Light Tone use `vert` to replace glyph.
• 2nd, 3rd, 4th tone marks use `vert` and `ruby` to replace glyphs to combining characters then adjust the position.

```
ˋ U+02CA ˊ U+0301
ˇ U+02C7 ˇ U+030C
ˋ U+02CB ˊ U+0300
```

• For full specification, see repo:
  https://github.com/bobbytung/Bopomofo_on_Web
Conclusion

- Font issues are outside W3C
  - Should we have a font community group?
- Could we solve other CJK issue in same way? i.e. Japanese Kanbun（漢文）.
- How to published the solution in standardization way? (an i18n note?)
Special Thanks

- Richard Ishida for usage and notes in i18n WG.
- Robin Berjon for HTML Ruby Markup Extensions
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- Jonathan Kew for fix harfbuzz engine's bug
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- Selena Wei for submission proposal to ISO/IEC JTC1 WG2