TYPESetting FOR A GLOBAL WEB

Chen Hui Jing / @hj_chen
<table>
<thead>
<tr>
<th>Team</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithuania</td>
<td>94</td>
</tr>
<tr>
<td>United States</td>
<td>90</td>
</tr>
</tbody>
</table>

Men's Basketball
Group B
Final
TYPESetting FOR A GLOBAL WEB

You Gotta
Love Frontend
Conference
@Vilnius, Lithuania
WHAT IS TYPOGRAPHY?

“Typography is the art and technique of arranging type to make written language legible, readable, and appealing when displayed.”

—Wikipedia
WHAT IS TYPOGRAPHY?

“Typography, the design, or selection, of letter forms to be organized into words and sentences to be disposed in blocks of type as printing upon a page.”

—Encyclopedia Britannica
WHAT IS TYPOGRAPHY?

“Typography is the visual component of the written word.”

—Matthew Butterick
WHAT IS TYPOGRAPHY?

“Typography is writing with prefabricated letters.”

– Gerrit Noordzij
WORLD WRITING SCRIPTS USAGE
(AS OF 2017)
LATIN SCRIPT DISTRIBUTION

א ב ג ד ה ژ ح خ ي ن ك ل م ن س ع ف ص ق ر ش ت خ

Arabic (28)

א ב ג ד ה ژ ح خ ي נ ק ל מ נ ס ע פ ص ق ر ש ت خ

Hebrew (22)

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  English (26)
WHAT ARE GLYPHS?
AND WHAT ABOUT FONTS?
Antras AUSZRA. metas.
Laikrastis, izleidziamas Lietuvos milētoju.

Dvi "Auszri" Lietuvoje.
Tankiba tai jīnē atsitikt, kaž šminē vienos dvāsē, un un vienmēr izmana toli vienas kā kās darība kojas vienībā vai tās patērē darba. Ne perai galiem nekā, kaip pirmsmēr vienat kā nepārāktās un kā kās neko nekājās sākās dzīves vieno-
kājās jāredz, kojas savā kojas. Visokiskā pāriem ir pasākumus sav vieno-
kājās gūst. Visokiskā gūst, kad ir tēlimais autūsiem per-
skaitēja, radīmu vienos kādu, radīmu un pa-

Ligā, ka ir dvejopas "Auszra" Lietuvojo atsitiko per vienos dava ir vienos dzīvīnas pasākumos, kurie buduši tikras Lietuvai, nos tās vienas kā-
kās dirba savākojums vienos. Dirba un at-

Tokši vienos vienos darbas rodo, ka Lietuvai nē-
pats mazākās likā paçozi piētu, nē saulskādes likā saul-
skādes tos vienos. Lai iztīto, ka ir vienos "Auszra" taip un vienos viss Lietuvin
"When you lose your language, you lose your soul.

—Ghil'ad Zuckermann"
WRITING SYSTEMS ON THE WEB
TYPESETTING ON THE WEB

“Authors should language-tag their content accurately for the best typographic behaviour.”

—CSS Text Module Level 3
POSTSCRIPT

Type 1 font program
## Font Formats for Web Use

<table>
<thead>
<tr>
<th>Font Format</th>
<th>Microsoft</th>
<th>Mozilla</th>
<th>Opera</th>
<th>Adobe</th>
<th>Apple</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOFF2 (Web Open Font Format 2)</td>
<td><img src="#" alt="Microsoft logo" /></td>
<td><img src="#" alt="mozilla logo" /></td>
<td><img src="#" alt="Opera logo" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WOFF (Web Open Font Format)</td>
<td><img src="#" alt="Microsoft logo" /></td>
<td><img src="#" alt="mozilla logo" /></td>
<td><img src="#" alt="Opera logo" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTF (OpenType)</td>
<td><img src="#" alt="Microsoft logo" /></td>
<td><img src="#" alt="Adobe logo" /></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TTF (TrueType)</td>
<td><img src="#" alt="Microsoft logo" /></td>
<td><img src="#" alt="Apple logo" /></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOT (Embedded Open Type)</td>
<td><img src="#" alt="Microsoft logo" /></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SVG (Scalable Vector Graphics)</td>
<td><img src="#" alt="w3c logo" /></td>
<td><img src="#" alt="svg logo" /></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.2 Font properties

Setting font properties will be among the most common uses of style sheets. Unfortunately, there exists no well-defined and universally accepted taxonomy for classifying fonts, and terms that apply to one font family may not be appropriate for others. E.g. *italic* is commonly used to label slanted text, but slanted text may also be labeled as being Oblique, Slanted, Incline, Cursive or Kursiv. Therefore it is not a simple problem to map typical font selection properties to a specific font.

CSS1 defines the properties 'font-family', 'font-style', 'font-variant' and 'font-weight', 'font-size', 'font'.

5.2.1 Font matching

Because there is no accepted, universal taxonomy of font properties, matching of properties to font faces must be done carefully. The properties are matched in a well-defined order to insure that the results of this matching process are as consistent as possible across UAs (assuming that the same library of font faces is presented to each of them).

Fonts section in CSS1 (17-Dec-1996)

<element name="font">...

W3C Superseded Recommendation

Requirements start and end tags. This allows you to change the font size and/or color for the enclosed text. The attributes are: size and color. Font sizes are given in terms of a scalar range defined by the user agent with no direct mapping to point sizes etc. The <font> element may be phased out in future revisions to HTML.

size

This sets the font size for the contents of the font element. You can set size to an integer ranging from 1 to 7 for an absolute font size, or specify a relative font size with a signed integer value, e.g. size="+1" or size="-2". This is mapped to an absolute font size by adding the current base font size as set by the nearest element (see below).

color

Used to set the color to stroke the text. Colors are given as RGB in hexadecimal notation or as one of 16 widely understood color names defined as per the BGColor attribute on the <body> element.

Font tag in HTML3.2 (14-Jan-1997)
3. Adding WebFonts to CSS

The font description provides the bridge between a font reference (within a stylesheet) and the font data, which is the data needed to format text and to render the glyph representations to which the characters map - the actual scalable outlines or bitmaps. Fonts are referenced by style sheet properties. The font description is used to select the relevant font data. The font description consists of descriptors which provide the location of the font data on the Web, and/or characterize that font data. The font descriptors are also used to match font references with the correct font description.

Font descriptors may be classified into three types:

1. those that provide the link between the CSS usage of the font and the font description - these have the same names as the corresponding CSS font properties
2. the URL for the location of the font data
3. those that further characterize the font, to provide a link between the font description and the font data

Font descriptions are contained in an @font-face. At-rules - so called because they start with the @ symbol - were introduced in CSS 1 where they were used to import other stylesheets. Ordinary CSS rules start with a selector, and apply solely to the selected HTML elements. At-rules have no selector, and apply to the whole style sheet.

The general form of this new at-rule is

```css
@font-face {<font description>
```

where the font description has the form:

```css
descriptor: value;
descriptor: value;
[...]
descriptor: value;
```

For example, here the font 'Roboto Condensed' is defined and referenced in a style sheet contained in an HTML document.

Earliest reference of webfonts I could find (21-Jul-1997)
## GENERIC FONT FAMILIES

Dependent on OS, HTML language, character set and browser.

<table>
<thead>
<tr>
<th>Style</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>serif</td>
<td>Times New Roman, SimSun, SongTi SC</td>
</tr>
<tr>
<td>sans-serif</td>
<td>Arial, Microsoft Yahei, PingFang SC</td>
</tr>
<tr>
<td>monospace</td>
<td>Consolas, SimSun, PingFang SC</td>
</tr>
<tr>
<td>cursive</td>
<td>Comic Sans MS, Apple Chancery, SimSun (oblique), SongTi SC (oblique)</td>
</tr>
<tr>
<td>fantasy</td>
<td>Gabriola, Impact, Papyrus, Microsoft Yahei, PingFang SC</td>
</tr>
</tbody>
</table>

Level 4 is adding system-ui, emoji, math and fangsong
/* This text is in Lucida Grande */

.sans {
}

/* A typical Chinese font stack, declare Latin fonts first */

.zh-hans {
  font-family: Tahoma, Helvetica, Arial, "Microsoft Yahei", "微软雅黑", STXihei, "
}
SUBSET FAIL
@font-face {
  font-family: 'Bellato';
  src: url('Bellota-Regular.woff2') format('woff2'),
     url('Bellota-Regular.woff') format('woff');
}
ANATOMY OF AN @font-face RULE

@font-face {
    font-family: <family-name>;
    src: [ <url> [format(<string> #)]? | <font-face-name> ] #;
    font-style: normal | italic | oblique;
    font-weight: normal | bold | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900;
    font-stretch: normal | ultra-condensed | extra-condensed | condensed | semi-condensed;
    unicode-range: <urange> #;
    font-variant: normal | none | [ <common-lig-values> | | <discretionary-lig-values> ]
    font-feature-settings: normal | <feature-tag-value> #;
}
This is a run of text.

Sometimes, text needs to be **bold**, other times, it needs to be *italic*.

Life is tricky when you have annoying people as colleagues.

Please love them anyway.
Hey @h_chen, I seem to remember you talking about subsetting your fonts quite a lot and wanting a thing in devtools to help locate missing characters. Do you mind sharing an example please? I'd like to test a thing I'm prototyping in this area.

Patrick Brosset @patrickbrosset · 24 Apr 2018

I had the idea when I was working on my slides built on reveal.js, here's a link to a reduced test case: goo.gl/PsR4KM the font I'm loading does not contain all the Ukrainian letters loaded, but at a glance it might not be obvious which letters are missing.

HJ Chen @h_chen

Replying to @patrickbrosset

This is a rough prototype for what I have in mind.

Patrick Brosset @patrickbrosset · 25 Apr 2018

Firefox Font Tools
backdrop

The backdrop is the content behind the element and is what the element is composited with.
This font does not support Cyrillic characters
@font-face {
    font-family: 'Raleway';
    src: url('fonts/raleway-regular.woff2') format('woff2'),
         url('fonts/raleway-regular.woff') format('woff');
    /* no range specified, defaults to entire range */
}

@font-face {
    font-family: 'Raleway';
    src: url('fonts/comfortaa_regular.woff2') format('woff2'),
         url('fonts/comfortaa_regular.woff') format('woff');
    unicode-range: U+0400-U+04FF; /* Unicode range for Cyrillic characters */
}
The Russian word for "Thank You" is "Спасибо".
### CSS Font Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>font-size</td>
<td>Indicates the desired height of the glyphs. Takes absolute or relative values.</td>
</tr>
<tr>
<td>font-weight</td>
<td>Specifies the weight of the glyphs in the font. Can use keywords or numerical values.</td>
</tr>
<tr>
<td>font-style</td>
<td>Allows italic or oblique faces to be selected.</td>
</tr>
<tr>
<td>font-stretch</td>
<td>Selects a normal, condensed or expanded face from a font family. Range spans over 9 keywords.</td>
</tr>
<tr>
<td>font-size-adjust</td>
<td>Adjusts the font-size to preserve the x-height of the first choice font.</td>
</tr>
<tr>
<td>font-synthesis</td>
<td>Controls whether user agents are allowed to synthesize bold or oblique font faces when missing.</td>
</tr>
</tbody>
</table>
font-synthesis

Minion Pro
Minion Pro Faux Bold
Minion Pro Bold

Roboto
Roboto Faux Bold
Roboto Bold

Minion Pro
Minion Pro Faux Italic
Minion Pro Italic

Faux bold effect
Faux italic effect

Image credit: Piotr Grochowski
VARIABLE FONTS

DRAGONS

---
Space
110

---
Weight
500
Source Hans Serif (65,535 glyphs)
PROGRESSIVE FONT ENRICHMENT

“to enable the ability for only the required part of the font be downloaded on any given page, and for subsequent requests for that font to dynamically ‘patch’ the original download with additional sets of glyphs as required on successive page views—even if they occur on separate sites.”

—Jason Pamental on Web Fonts & Typography News #11
**INCREMENTAL TRANSFER DEMO**

Transfer Options

**NOTE:** all options other than incremental transfer break layout features across segments. In reality this forces the use of large blocks in many scenarios (Arabic, Hindi, many Latin cases, etc.)

- Codepoints (72 + 21 + 33 + 54 + 23 + 19) in Demo Content

Options:
- A) What Google Fonts would send today, 34.9 KB:
  - 13.8 KB (woff2)
  - 21.2 KB (lin)
- B) woff2 of each segment, 24.5 KB:
  - 6.3 KB (woff2)
  - 5.3 KB (woff2)
  - 5.3 KB (woff2)
  - 2.8 KB (woff1)
  - 2.6 KB (woff2)
- C) Incremental Transfer 7 patches 30.3 KB:
  - 2.9 KB patch
  - 2.1 KB patch
  - 2.8 KB patch
- D) Optimal, woff2 of the exact subset:
  - 8.6 KB (woff2)

Demo Content

**CHINESE**

각 부분에 대한 정확한 위치는 시간이 지남에 따라 변동이 있을 수 있으므로, 대략적인 위치를 기준으로 하여 작업을 진행합니다.

**RUSSIAN**

Чтобы быть уверенными в правильности передачи данных, мы используем волшебные патчи, которые позволяют передавать только необходимые данные.

Google Fonts’ Incremental Transfer Demo
Hi, I'm Jason

My name is Jason Pamental. I'm a design strategist, UX leader, technologist, expert in web typography, and Invited Expert on the W3C Web Fonts Working Group. I write, speak, and work with brand owners on how to set type better on digital platforms. I've spoken with organizations like Adobe, Audible, Condé Nast, GoDaddy, IBM—and given presentations and workshops at conferences all over the world. I also publish a newsletter on web typography.

Type is how we ‘hear’ what we read

Since the introduction of Variable Fonts in late 2016, I’ve spent a good deal of time researching, writing about, and working with them, and am excited about the future of type and its role in designing good, readable digital experiences.
The DOM, the HTML syntax, and the XHTML syntax cannot all represent the same content. For example, namespaces cannot be represented using the HTML syntax, but they are supported in the DOM and in the XHTML syntax.
font-variant-east-asian

Allows control of glyph substitution and sizing in East Asian text

一個簡體字可能對應多個繁體字，如簡體字「發」，其相應的繁體字可能為「發」或「髮」；一個繁體漢字對應多個簡體漢字的情況與前者相比數量極少但仍需註意，如繁體字「乾」可能對應簡體字「幹」或「乾」。繁簡漢字的對應關係具體應由上下文決定。

茨 噘

.fvea .han {
  font-variant-east-asian: traditional;
}

.fvea .jap {
  font-variant-east-asian: jis78;
}
font-language-override
To control the use of language-specific glyph substitutions and positioning

<!-- Macedonian lang code -->
<body lang="mk">
 <h4>Член 9</h4>
 <p>Никој човек нема да биде подложен на произволно апсење, притвор или прогонување.</p>
</body>

body {
 /* Serbian OpenType language tag */
 font-language-override: "SRB";
}

Example lifted from CSS Fonts Module Level 4
Drop a font!

Fonts aren’t uploaded, they stay on your computer

https://wakamaifondue.com/
GOLDEN RULES FOR WEB TYPOGRAPHY
BY RICHARD RUTTER

1. Don't trust computers
2. Use the default font size for paragraph text
3. Adjust type size according to reading distance
4. Adjust the font size if the typeface requires it
5. Set tables to be read
6. Set text at display sizes, even on small screens
7. Resize display text as you would an image
8. Reduce your payload
9. Optimise page render timing
10. Learn to use variable fonts

Web Typography @ CSS Day 2018
THE text-transform PROPERTY

IF I WANT [FLOWERS], I’M GOING TO SEND THEM TO MYSELF.

SÜSSE SOSSEN-KLÖSSE GENIESSEN MASSGEBLICH GEFRÄSSIGE PREUSSISCHE NUTZNIESSER.

ΟΥΔΈΝ ΚΑΚΌΝ ΑΜΙΓΈΣ ΚΑΛΌΥ.

アイウェ オカクケ
If an element generates zero boxes, was it really there at all?

```html
<p class="line-container">If an element <em>generates zero boxes</em>, was it <strong>really there</strong> at all?</p>
```

```css
.linebox p.line-container {
    font-size: 150%;
}
.linebox .line-container em {
    background-color: limegreen;
    padding: 0.25em;
    mix-blend-mode: color;
}
```
## CSS for Controlling Line Breaks

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>line-break</td>
<td>allows choosing various levels of “strictness” for line breaking restrictions</td>
</tr>
<tr>
<td>word-break</td>
<td>controls what types of letters are glommed together to form unbreakable “words”, causing CJK characters to behave like non-CJK text or vice versa</td>
</tr>
<tr>
<td>hyphens</td>
<td>controls whether automatic hyphenation is allowed to break words in scripts that hyphenate</td>
</tr>
<tr>
<td>overflow-wrap</td>
<td>allows the UA to take a break anywhere in otherwise-unbreakable strings that would otherwise overflow</td>
</tr>
</tbody>
</table>

**Line breaking** by Florian Rivoal @ dotCSS
HYPHENATION

“"If you don't give a lang attribute, you don't get automatic hyphenation."" — Florian Rivoal

Browsers use language-specific dictionaries to figure out where the hyphenation points should be.
text-align & text-justify

- Sets the text-align-all and text-align-last properties
- Describes how the inline-level content of a block is aligned along the inline axis if the content does not completely fill the line box.

```
text-align: start | end | left | right | center | justify | match-parent | justify
```

Values other than justify-all or match-parent are assigned to text-align-all and reset text-align-last to auto.

Selects the justification method used when a line’s alignment is set to justify

```
text-justify: auto | none | inter-word | inter-character
```
As you can see, the text is aligned to the left margin meaning that not all of the text will align to the right margin. Here’s an example of justified website text. As you can see, the text is aligned to both the left margin and right margins, meaning that each line will be the same length.

Don’t use fully justified text alignment on your website
定义了CSS如何支持各种不同国际化语言的书写模式，例如拉丁（Latin）语系及印度（Indic）语系采用从左到右的书写模式，希伯来语（Hebrew）或阿拉伯语（Arabic）采用从右到左的书写模式，一些混合了拉丁语和阿拉伯语的文字可能采用双向书写（bidirectional），而一些东亚文字则需要竖排（从上到下）的书写模式。
VERTICAL TEXT ON THE WEB

CSS Writing Modes Level 3 defines CSS features to support for various international writing modes, such as left-to-right (e.g. Latin or Indic), right-to-left (e.g. Hebrew or Arabic), bidirectional (e.g. mixed Latin and Arabic) and vertical (e.g. Asian scripts).
writing-mode PROPERTY

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>horizontal-tb</td>
<td>从1987到现在</td>
</tr>
<tr>
<td>vertical-rl</td>
<td>从1987到现在</td>
</tr>
<tr>
<td>vertical-lr</td>
<td>从1987到现在</td>
</tr>
<tr>
<td>sideways-rl*</td>
<td>从1987到现在</td>
</tr>
<tr>
<td>sideways-lr*</td>
<td>从1987到现在</td>
</tr>
</tbody>
</table>

Properties marked with * have been deferred to Writing Modes Level 4.
text-orientation PROPERTY

mixed

from 1987 to now

upright

from 1987 to now

sideways

from 1987 to now
text-combine-upright PROPERTY

<table>
<thead>
<tr>
<th>none</th>
<th>all</th>
<th>digits &lt;integer&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>民國107年5月25日</td>
<td>民國107年5月25日</td>
<td>民國107年5月25日</td>
</tr>
</tbody>
</table>

Codepen example for text-combine-upright
Cuba
Lithuania
Liechtenstein
NOT JUST FOR EAST ASIAN TEXT

Kaip ažuolų drūtų prie Nemunėlio
Lietuvis nieko neatbosi!
Kaip eglė ten prie Šešupėlės
Ir vėtroj, ir žiemą žaliuos!

Lietuviai esame mes gimę,
Lietuviai norime ir būt!
Tą garbę gavome užgimę,
Jai ir neturim leist pražūt!

Ką darai, daryk gera!
The W3C Internationalization (I18n) Activity works with W3C working groups and liaises with other organizations to make it possible to use Web technologies with different languages, scripts, and cultures. From this page you can find articles and other resources about Web internationalization, and information about the groups that make up the Activity. Read also about the opportunities to participate and fund work via the new Sponsorship Program.

New resource: Short i18n review checklist March 7, 2019
Working Group Note: Character Model for the World Wide Web: String Matching February 4, 2019
One new, one updated article published January 23, 2019
Article published: Approaches to line-breaking August 13, 2018
For 2nd review: Approaches to line breaking July 26, 2018
W3C launches Internationalization Initiative July 10, 2018
For review: Approaches to line breaking June 13, 2018
For last call review: Character Model for the World Wide Web: String Matching May 8, 2018

New resource: Short i18n review checklist March 7, 2019
The Short i18n review checklist points developers of specifications to various aspects of a spec that may need internationalization review. It can also be used by spec reviewers, to get an idea of what to look for in a spec.

Only 12 items long, it follows the format: if the spec or its implementation does X then check Y, and points to the relevant parts of the detailed checklist for more information.
AČIŪ!

https://www.chenhuijing.com

@hj_chen

@hj_chen

@huijing

Header font is Movement by Maria Ramos and Noel Pretorius. Body font is PT Sans by Alexandra Korolkova.