The SignWriting Stack 2015

Presented at the SignWriting Symposium on July 21st by Stephen E Slevinski Jr in association with the Center for Sutton Movement Writing
The SignWriting Stack

the collection of technologies working together that makes it possible to use SignWriting on desktops, tablets, and phones.
# The SignWriting Stack 2015

<table>
<thead>
<tr>
<th>Technology</th>
<th>Platforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal SignWriting (FSW)</td>
<td>Explorer, Windows</td>
</tr>
<tr>
<td>International SignWriting Alphabet 2010 (ISWA 2010)</td>
<td>FireFox, Linux</td>
</tr>
<tr>
<td>Regular Expressions (Regex)</td>
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<td>TrueType Fonts (TTF)</td>
<td>Android, OS X, iOS</td>
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The SignWriting Stack 2015

A. The Bottom Layers: Fonts, Browser, and OS

B. The Middle Layers: JS, CSS, and SVG

C. The Top Layers: FSW, ISWA 2010, and Regex

D. The Flow of the System

E. Case Studies
   1. SignWriting 2010 JavaScript Library
   2. SignWriting Character Viewer
   3. SignMaker
The SignWriting Stack 2015

The Bottom Layers

- Font Technology
- Modern Browser
- Operating System

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Font Technology

Reserved Font Names
• SignWriting 2010
• SignWriting 2010 Filling

Font Installation
• System Install
• CSS font-face remote

TrueType Fonts (TTF)

https://github.com/Slevinski/signwriting_2010_fonts
http://slevinski.github.io/sw10js/guide.html#ttf
Modern Browser

Today’s Technology
• Newer Phones
• Every browser

Tomorrow’s Technology
• Vertical Writing Mode: non-Gecko based browser
  https://incubator.wikimedia.org/wiki/Wp/ase
• 2D Font with GPOS Layout: Graphite & FireFox
  http://www.signwriting.org/symposium/presentation0019.html

http://slevinski.github.io/sw10js/tests/
Operating System

Minimal System Requirements
• Reasonable TrueType font support

Font Installation
• CSS font-face remote for all
• System install for all but Android

Supported Systems

Windows  Linux  Android  OS X  iOS
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The Middle Layers

- Programming Environment
- Presentation Styling
- 2-Dimensional Placement
Programming Environment

Any Programming Language

• Prefer JavaScript without dependencies
• Other Programming languages can be used

JavaScript (JS)

SignWriting 2010 JavaScript Library

• micro-library, less than 6 KB zipped
• Supports images, searching, and more

http://slevinski.github.io/sw10js/
http://slevinski.github.io/sw10js/api.html
Presentation Styling

CSS Usage

- **font-face** statement to conditionally load fonts
- set **fill** for text to adjust color
- **text-shadow** and animations

Cascading Style Sheets (CSS)

http://slevinski.github.io/sw10js/guide.html#css
2-Dimensional Placement

SVG is a widely supported standard that is available in most environments with a variety of options. 2-Dimensional placement is supported with cartesian coordinates.

Scalar Vector Graphics (SVG)

```xml
<g transform="translate(491,505)">
  <text class="sym-fill">●</text>
  <text class="sym-line">•</text>
</g>

<g transform="translate(485,481)">
  <text class="sym-fill">●</text>
  <text class="sym-line">φ</text>
</g>
```
The SignWriting Stack 2015

- Formal SignWriting (FSW)
- International SignWriting Alphabet 2010 (ISWA 2010)
- Regular Expressions (Regex)

The Top Layers

- Names as Strings
- The Alphabet
- Universal Processing
According to Wikipedia, "In mathematics, computer science, and linguistics, a formal language is a set of strings of symbols that may be constrained by rules that are specific to it."

Sign as Word

• Mathematical ASCII name
• Optional time for sorting
• Mandatory space for visual

The International SignWriting Alphabet 2010 (ISWA 2010) is an ordered collection of visually iconic symbols that exists in a layered hierarchy. The ISWA 2010 is a product of the collaboration between SignWriting inventor, Valerie Sutton, and SignWriting encoder Stephen E Slevinski Jr.

- symbols represent meaning
- symbols combine in 2-dimension arrangements

http://www.movementwriting.org/symbolbank/
Universal Processing

A regular expression is used to examine text and identify strings that match a stated pattern. A regular expression is written in a concise and flexible formal language.

Regular Expressions (Regex)

Formal SignWriting is a heuristic model initially created in 2008 based on regular expression processing. After several generations of refactored data, the model has been optimized for common usage and processing. The model has been stable since January 12th, 2012.

- FSW strings are defined with regular expressions
- Query strings are used to search FSW strings
- FSW strings transform into several variety of query string
- Query strings transform into regular expressions 15+ times larger


https://en.wikipedia.org/wiki/Regular_expression
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The Flow of the System

Unicode 8
ligatures of 1 to 3 characters

TTF

PUA Plane 16
single character per symbol

SVG
15 times expansion

CSS
style text

Formal SignWriting
search results

Query Strings

10% to 50% reduction

JS
15 to 50 times expansion

Regular Expressions
process million of characters per second

PUA Plane 15
twice the size

Isomorphic

Graphite Font
cartesian coordinates with GPOS

ASCII
Case Study 1
SignWriting 2010 JavaScript Library

http://slevinski.github.io/sw10js
Case Study 2

SignWriting Character Viewer

Code Breakdown

110 KB in Single File

- Messages: User Interface and Names
- Libraries: Mithril JS and SW10 JS
- Custom: HTML, JS, and CSS

http://signbank.org/SignWriting_Character_Viewer.html
Case Study 3

SignMaker 2015

Code Breakdown

http://www.signbank.org/signmaker.html
The SignWriting Stack 2015

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http://www.signwriting.org/symposium/presentation0043.html

Thanks for viewing.

Feedback, bug reports, and patches are welcomed.