



# 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

**Formal SignWriting (FSW)**

**International SignWriting Alphabet 2010 (ISWA 2010)**

**Regular Expressions (Regex)**

**JavaScript (JS)**

**Cascading Style Sheets (CSS)**

**Scalar Vector Graphics (SVG)**

**TrueType Fonts (TTF)**

**Explorer**

**FireFox**

**Chrome**

**Safari**

**Opera**

**Windows**

**Linux**

**Android**

**OS X**

**iOS**

# 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

TrueType Fonts (TTF)				
Explorer	FireFox	Chrome	Safari	Opera
Windows	Linux	Android	OS X	iOS

# 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](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>

**Explorer**

**FireFox**

**Chrome**

**Safari**

**Opera**

<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



# The SignWriting Stack 2015

## The Middle Layers

**JavaScript (JS)**

**Cascading Style Sheets (CSS)**

**Scalar Vector Graphics (SVG)**

- Programming Environment
- Presentation Styling
- 2-Dimensional Placement

# Programming Environment

## Any Programming Language

- Prefer JavaScript without dependancies
- 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/>

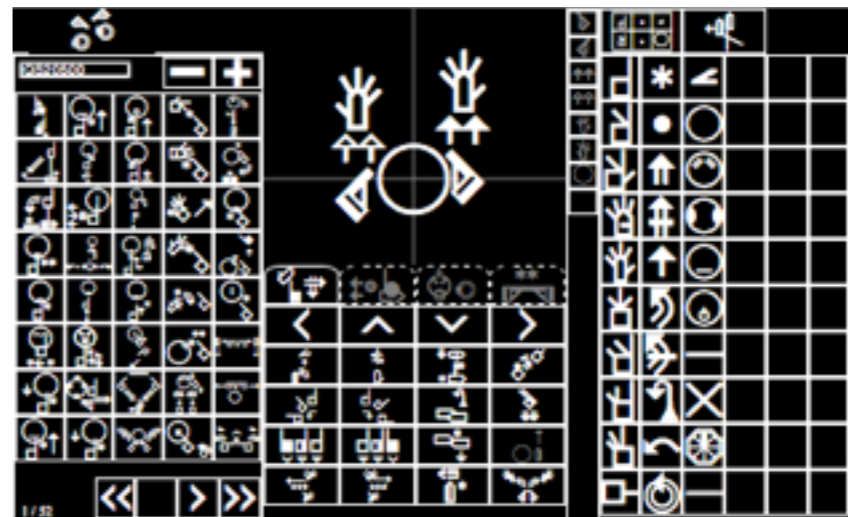
<http://slevinski.github.io/sw10js/api.html>

# 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)

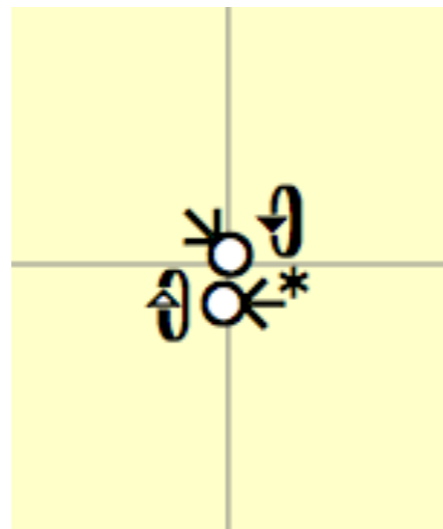
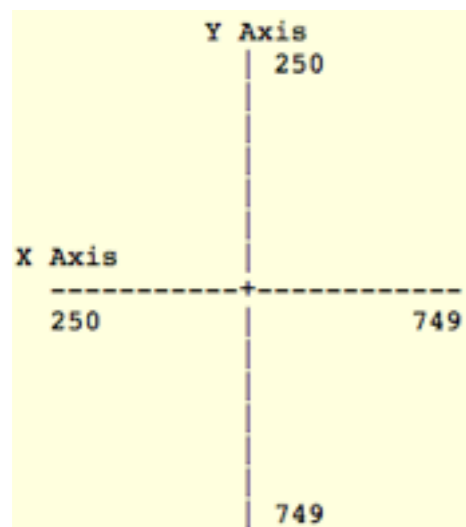


<http://slevinski.github.io/sw10js/guide.html#css>

# 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)



```
<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">⊙</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



# Names as String

## Formal SignWriting (FSW)

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 Alphabet

stable since the initial release on October 20th, 2010

## International SignWriting Alphabet 2010 (ISWA 2010)

The International SignWriting Alphabet 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/>

<https://tools.ietf.org/html/draft-slevinski-signwriting-text-05#appendix-B>

# 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://tools.ietf.org/html/draft-slevinski-signwriting-text-05#section-3>

[https://en.wikipedia.org/wiki/Regular\\_expression](https://en.wikipedia.org/wiki/Regular_expression)

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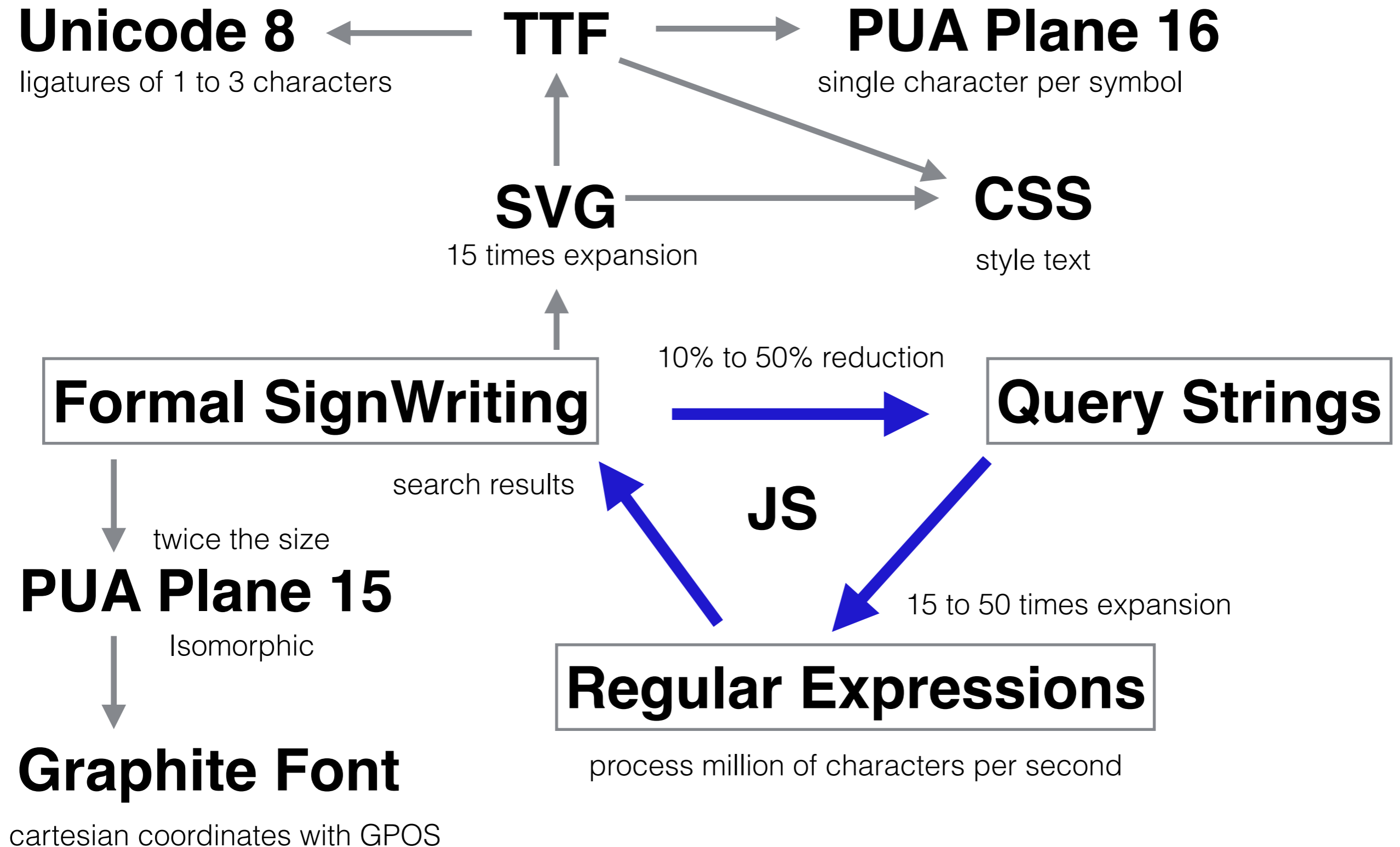
**Linux**

**Android**

**OS X**

**iOS**

# The Flow of the System





# Case Study 1

## SignWriting 2010 JavaScript Library

SignWriting 2010

Guide API Test Download GitHub

The modern implementation and international specification of the SignWriting script for the internet community that includes TrueType Fonts, CSS Declarations, and a compact JavaScript Library.

**Getting Started**  
Learn how to install and use the SignWriting 2010 components.

**API Documentation**  
Explore the JavaScript library for all available functions.

**Testing Suites**  
Verify the main functions, symbol sizing, and range checks in the browser.

**TrueType Fonts**  
The SignWriting 2010 TrueType fonts are available for download and installation. The fonts have been tailored for the SignWriting 2010 JavaScript library. Install instructions available for Windows, Linux, Mac, and iOS.

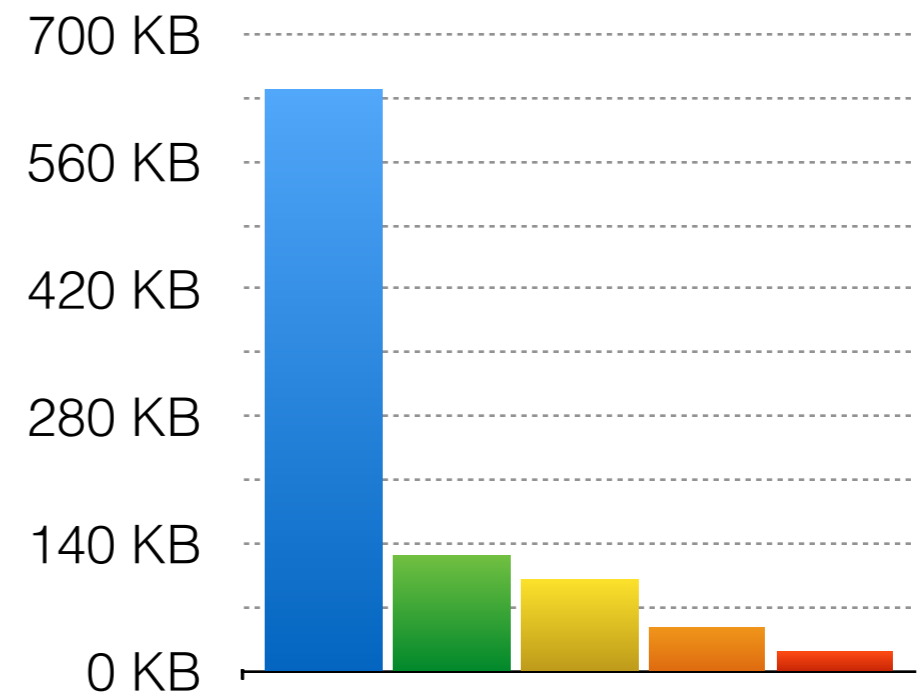
**CSS Declarations**  
Standard CSS is used to conditionally load the fonts. Additional CSS is available to set position, color, and size for the symbols and signs.

**JavaScript Library**  
The JavaScript library leverages the TrueType fonts without any additional requirements. Simply include the SignWriting 2010 JavaScript file in any HTML page to access the function library.

**Internet Draft**  
The SignPuddle Standard for SignWriting Text Internet Draft has been submitted to the IETF as draft-slevinski-signwriting-text. The I-D contains detailed information about a variety of topics related to SignWriting.

SignWriting 2010 JavaScript Library  
Copyright (c) 2007-2015, Stephen E Slevinski Jr  
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## Code Breakdown



- Testing: CSS, JS, and HTML
- Assets: Logo and I-D Reference
- Bootstrap CSS
- Pages: Index, Guide, and API
- Library: sw10.min.js

<http://slevinski.github.io/sw10js>

# Case Study 2

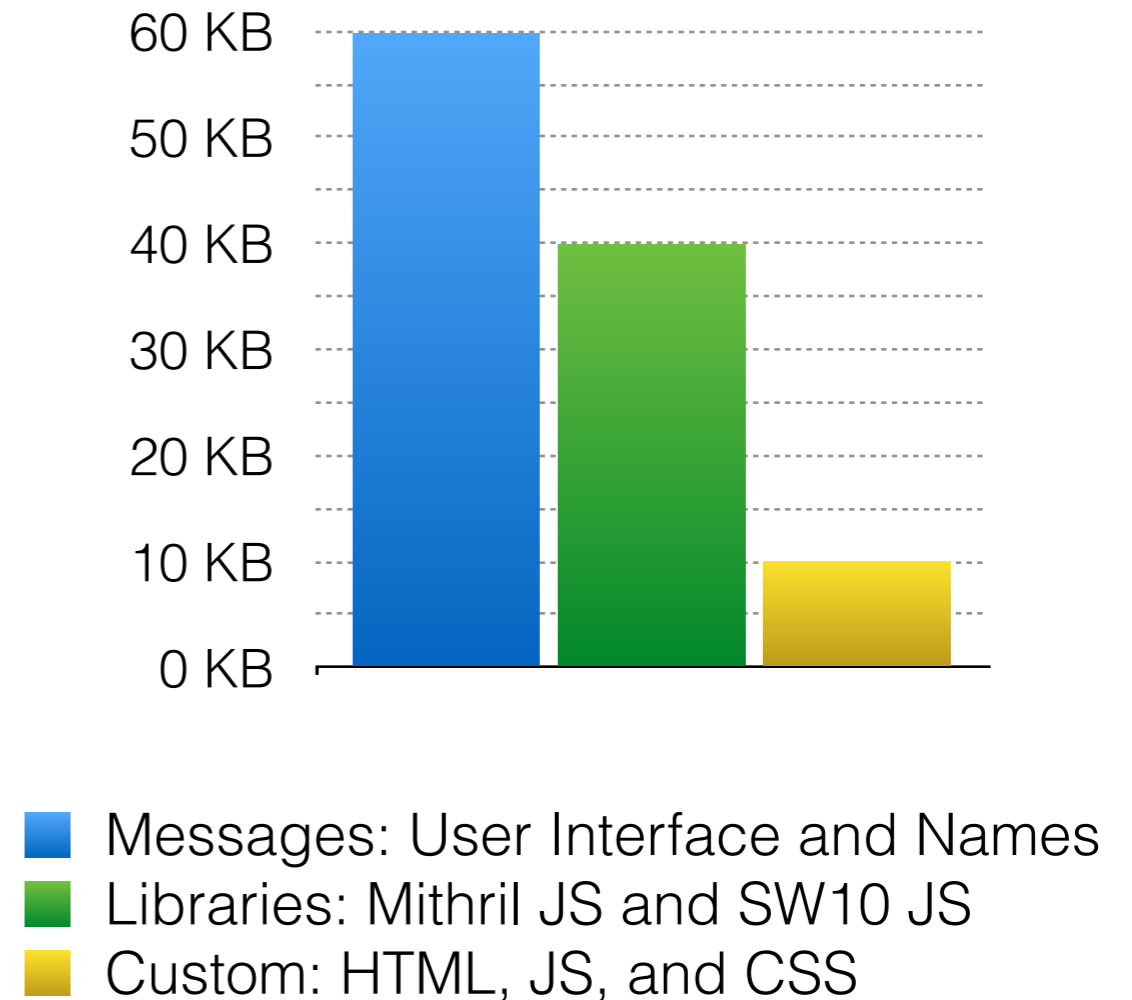
**SignWriting Character Viewer**

Symbols Keys    Unicode 8    PUA Plane 15    PUA Plane 16

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
U+1D80x	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞
U+1D81x	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞
U+1D82x	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞
U+1D83x	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞
U+1D84x	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞
U+1D85x	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞
U+1D86x	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞	☞

## Code Breakdown

110 KB in Single File



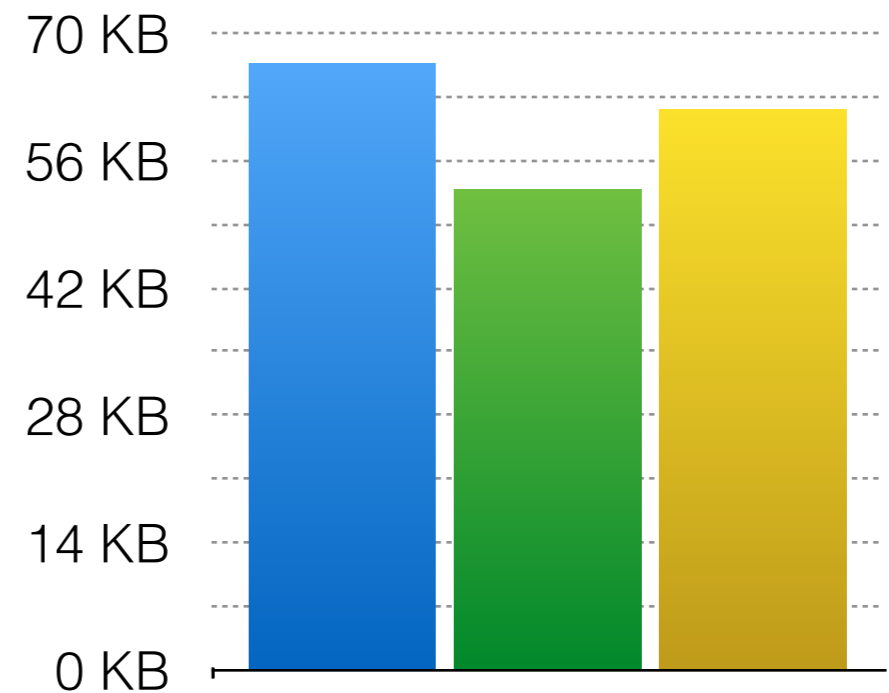
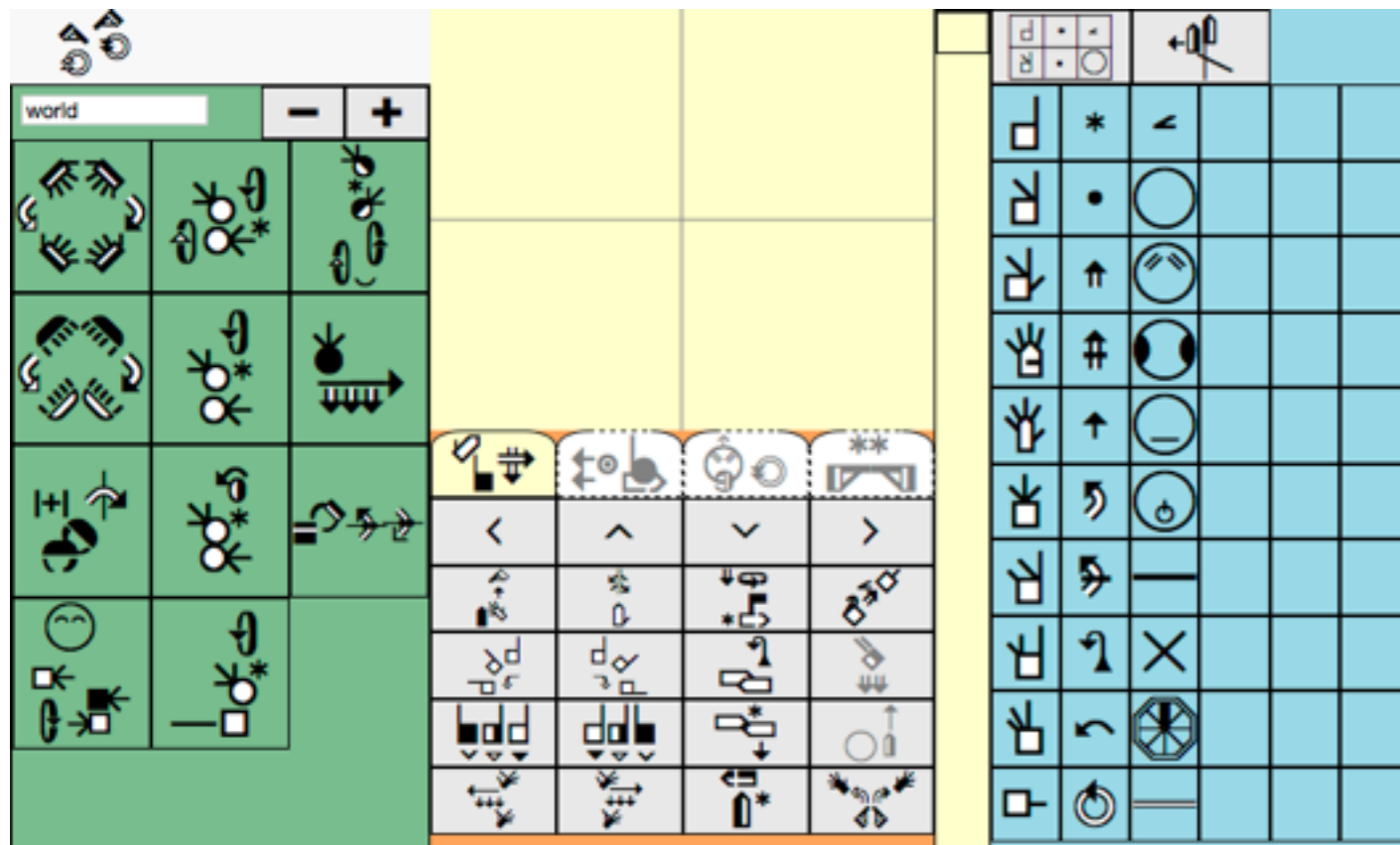
[http://signbank.org/SignWriting\\_Character\\_Viewer.html](http://signbank.org/SignWriting_Character_Viewer.html)



# Case Study 3

## SignMaker 2015

## Code Breakdown



- Configuration
- Support Libraries
- Custom HTML, JS, and CSS

<http://www.signbank.org/signmaker.html>

# The SignWriting Stack 2015

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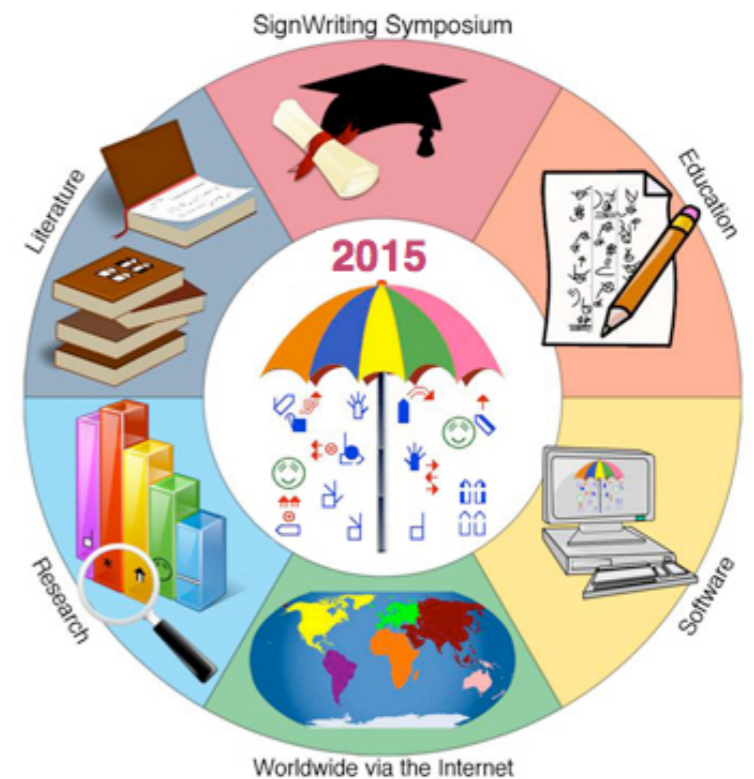


<http://slevinski.github.io>

<https://twitter.com/slevinski>

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

SignWriting Symposium 2015



Thanks for viewing.

Feedback, bug reports, and patches are welcomed.