

Lecture 11

*408/508 Computational  
Techniques for Linguists*

# Today

- New topic:
  - start with html5
    - html
    - css
    - javascript
  - *leading to building your own webserver*

# Browser

- Nowadays browsers are very powerful in their own right (can compute locally, not just communicate with a webserver)



CSS (Cascading Style Sheets)

SVG (Scalable Vector Graphics)

- cf. HTML5 canvas

Javascript

- *programming language*

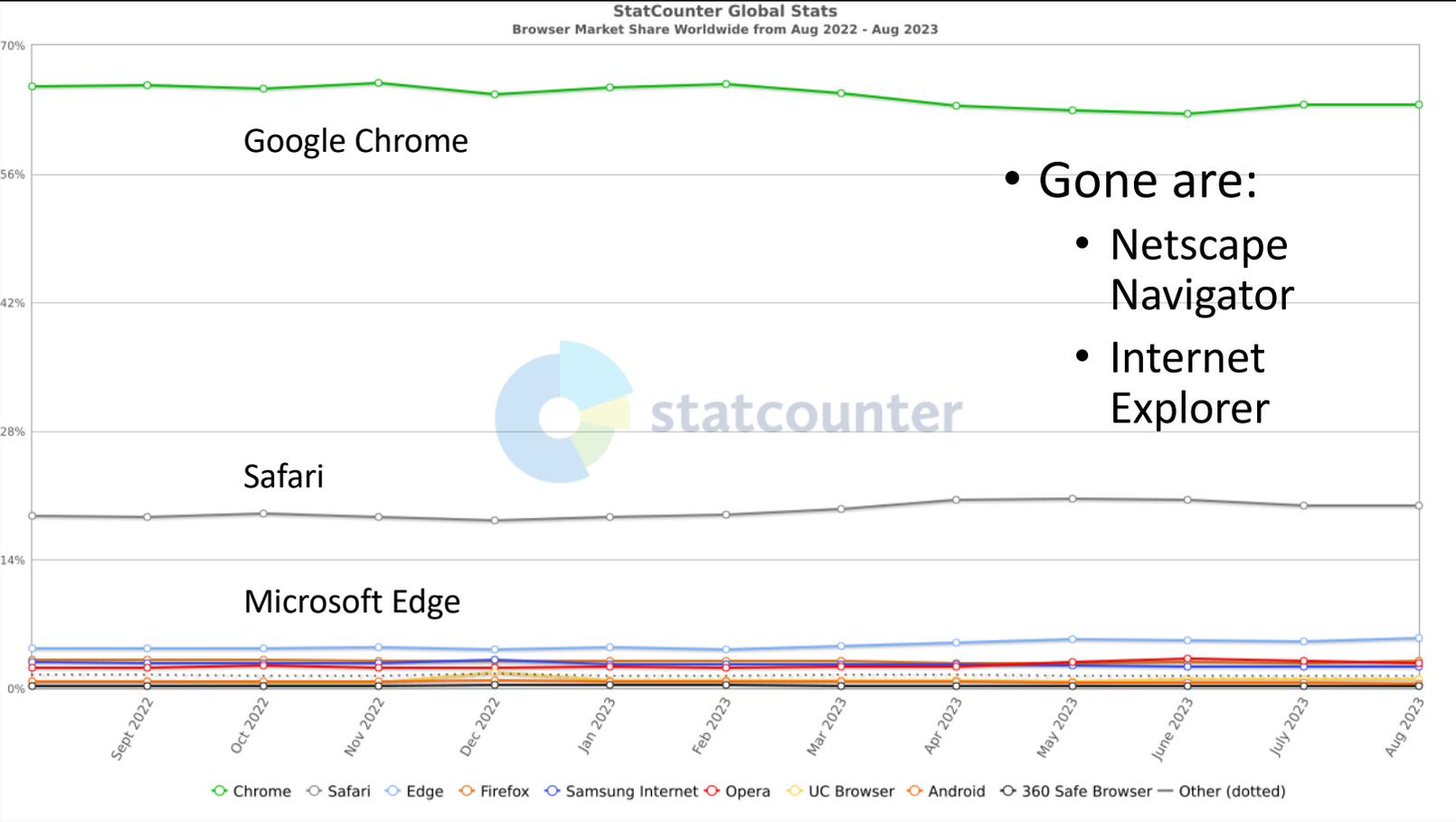
DOM (Domain Object Model)

- *programmatic access to documents*

Websockets

- An API to interact with regular programs

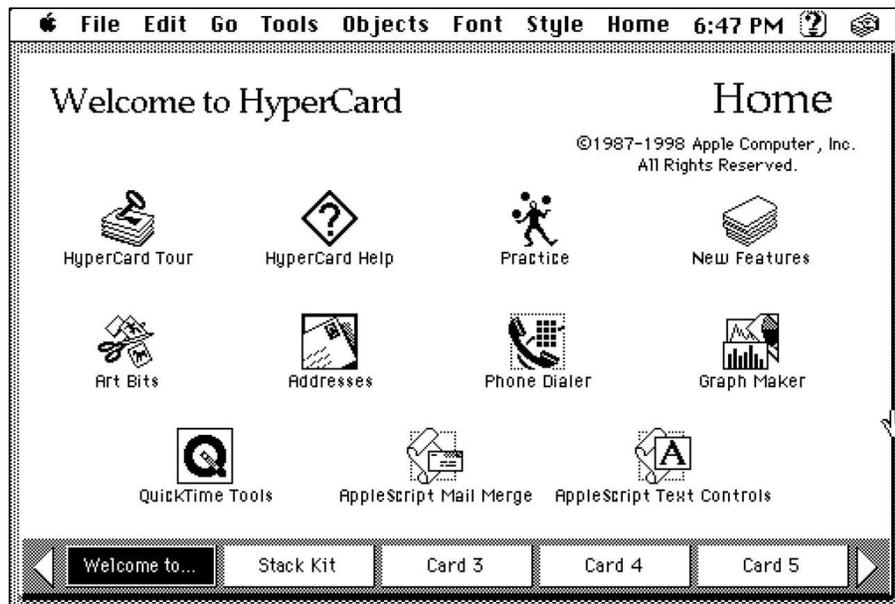
# Browsers



# HTML

- HTML: Hypertext Markup Language
  - Web browser: can read and render pages written in HTML
  - **currently:** HTML5
- What is "hypertext"?
  - linked content (Nelson, 1963)
  - nowadays: selected text/images/video can have arbitrary associated actions
- Hypercard for the Macintosh (1987)
- World Wide Web (WWW) (1992)
  - World Wide Web Consortium (W3C)

# Hypercard



- Before WWW
  - 1987
  - card stack with links
- Myst
  - 1993
  - a computer game
  - developed using Hypercard

# World's first webpage

## World Wide Web

The WorldWideWeb (W3) is a wide-area [hypermedia](#) information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an [executive summary](#) of the project, [Mailing lists](#) , [Policy](#) , November's [W3 news](#) , [Frequently Asked Questions](#) .

### [What's out there?](#)

Pointers to the world's online information, [subjects](#) , [W3 servers](#), etc.

### [Help](#)

on the browser you are using

### [Software Products](#)

A list of W3 project components and their current state. (e.g. [Line Mode](#) ,X11 [Viola](#) , [NeXTStep](#) , [Servers](#) , [Tools](#) , [Mail robot](#) , [Library](#) .)

### [Technical](#)

Details of protocols, formats, program internals etc

### [Bibliography](#)

Paper documentation on W3 and references.

### [People](#)

A list of some people involved in the project.

### [History](#)

A summary of the history of the project.

### [How can I help ?](#)

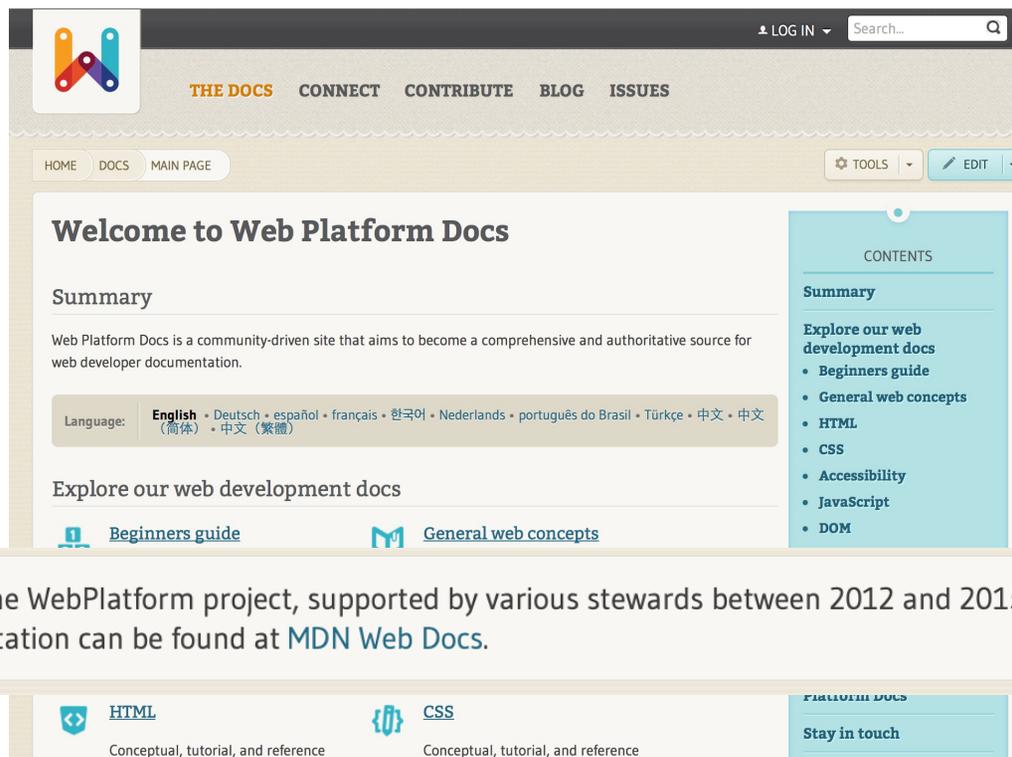
If you would like to support the web..

### [Getting code](#)

Getting the code by [anonymous FTP](#) , etc.

- At CERN:
  - August 6 1991
  - by Tim Berners-Lee
- Notice:
  - text, no graphics
  - no fancy fonts
  - no sidebars
  - no advertising
  - no Javascript

# Reference



<https://webplatform.github.io>

*Now deprecated...*

**Notice:** The WebPlatform project, supported by various stewards between 2012 and 2015, has been **discontinued**. This site is now available on [github](#). New documentation can be found at [MDN Web Docs](#).

# MDN



# Reference

<https://developer.mozilla.org/en-US/docs/Web/Tutorials>

The screenshot shows the MDN Web Docs interface for the article 'For complete beginners to the Web'. The page has a dark header with the MDN logo and 'mdn web docs' text. Below the header, there are navigation links for 'References' and 'Tutorials', and a language selector set to 'English (US)'. On the left side, there is a sidebar titled 'In this article' with a list of links: 'For complete beginners to the Web' (highlighted), 'HTML Tutorials', 'CSS Tutorials', and 'JavaScript Tutorials'. The main content area features the article title 'For complete beginners to the Web' in large white text, followed by a sub-link 'Getting started with the Web'. Below this is a paragraph of introductory text. Further down, there is a section for 'HTML Tutorials' with the sub-section 'Introductory level' and a link to 'Introduction to HTML'. The bottom of the visible text reads 'This module sets the stage, getting you used to important'.

The screenshot shows the MDN Web Docs interface for the article 'CSS Tutorials'. The page has a dark header with the MDN logo and 'mdn web docs' text. Below the header, there are navigation links for 'References' and 'Tutorials', and a language selector set to 'English (US)'. On the left side, there is a sidebar titled 'In this article' with a list of links: 'For complete beginners to the Web', 'HTML Tutorials', 'CSS Tutorials' (highlighted), and 'JavaScript Tutorials'. The main content area features the article title 'CSS Tutorials' in large white text, followed by the sub-section 'Introductory level'. Below this is a link to 'CSS basics', followed by a paragraph of introductory text. Further down, there is a link to 'CSS first steps', followed by another paragraph of introductory text. The bottom of the visible text reads 'add animations and other decorative features. This module'.

# Reference

<https://developer.mozilla.org/en-US/docs/Web/Tutorials>

The screenshot shows the MDN Web Docs interface for the 'CSS Challenges' article. The breadcrumb trail is 'References > Tutorials'. The page title is 'CSS Challenges' with an external link icon. The main heading is 'Advanced level' with a sub-heading 'Using CSS transforms' and a description: 'Apply rotation, skewing, scaling, and translation using CSS.' Below this, there are sections for 'CSS transitions' and 'Canvas tutorial'. On the left, a sidebar titled 'In this article' lists 'For complete beginners to the Web', 'HTML Tutorials', 'CSS Tutorials' (highlighted), and 'JavaScript Tutorials'.

mdn web docs

References > Tutorials English (US)

[CSS Challenges](#)

In this article

For complete beginners to the Web

HTML Tutorials

**CSS Tutorials**

JavaScript Tutorials

Flex your CSS skills, and see where you need more practice.

## Advanced level

[Using CSS transforms](#)

Apply rotation, skewing, scaling, and translation using CSS.

[CSS transitions](#)

CSS transitions provide a way to animate changes to CSS properties, instead of having the changes take effect instantly.

[Canvas tutorial](#)

Learn how to draw graphics using scripting using the canvas element.

The screenshot shows the MDN Web Docs interface for the 'JavaScript Tutorials' article. The breadcrumb trail is 'References > Tutorials'. The page title is 'JavaScript Tutorials'. The main heading is 'Introductory level' with a sub-heading 'JavaScript first steps' and a description: 'In our first JavaScript module, we first answer some fundamental questions such as "what is JavaScript?", "what does it look like?", and "what can it do?", before moving on to taking you through your first practical experience of writing JavaScript. After that, we discuss some key JavaScript features in detail, such as variables, strings, numbers and arrays.' Below this, there is a section for 'JavaScript building blocks'. On the left, a sidebar titled 'In this article' lists 'For complete beginners to the Web', 'HTML Tutorials', 'CSS Tutorials', and 'JavaScript Tutorials' (highlighted).

mdn web docs

References > Tutorials English (US)

## JavaScript Tutorials

In this article

For complete beginners to the Web

HTML Tutorials

CSS Tutorials

**JavaScript Tutorials**

### Introductory level

[JavaScript first steps](#)

In our first JavaScript module, we first answer some fundamental questions such as "what is JavaScript?", "what does it look like?", and "what can it do?", before moving on to taking you through your first practical experience of writing JavaScript. After that, we discuss some key JavaScript features in detail, such as variables, strings, numbers and arrays.

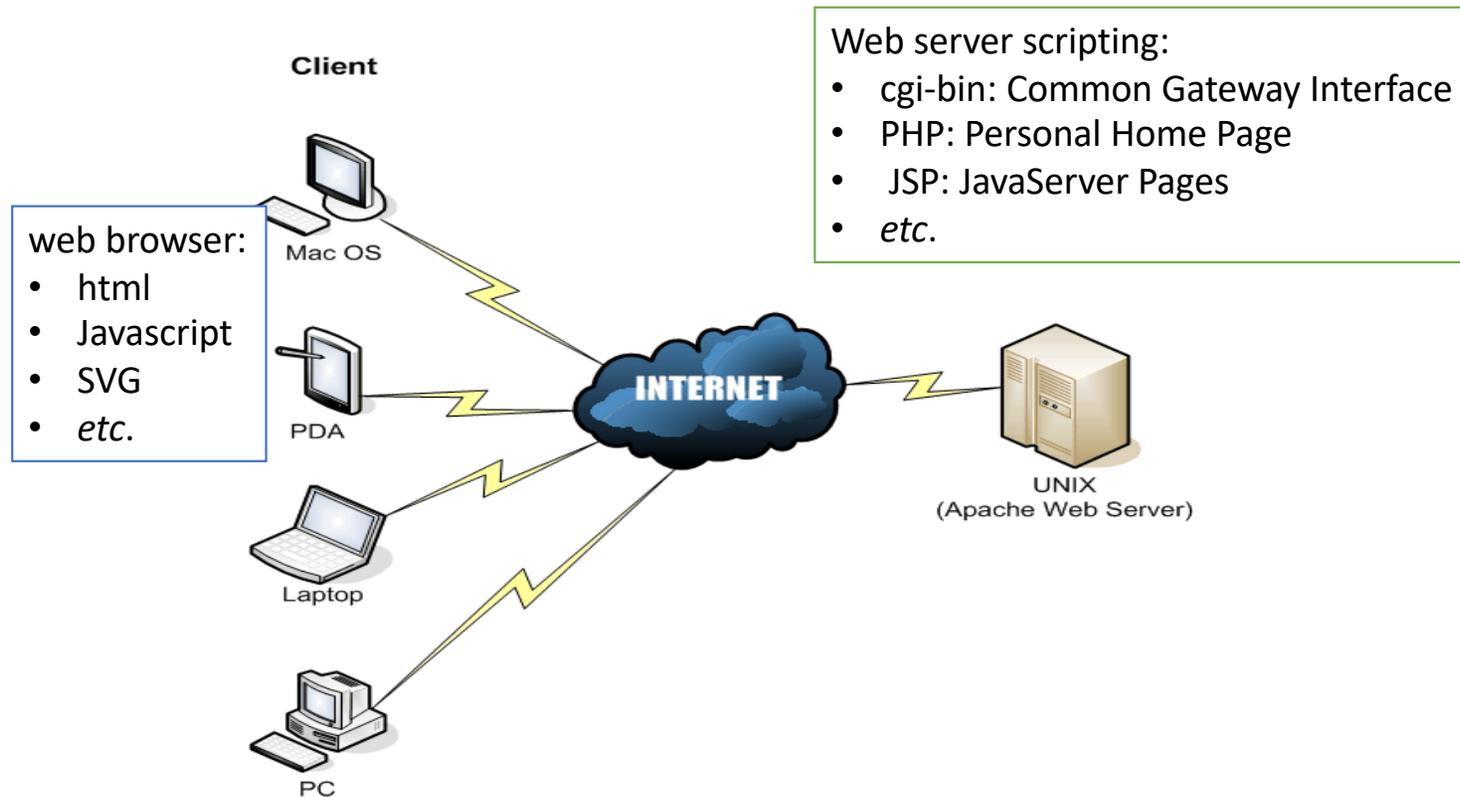
[JavaScript building blocks](#)

In this module, we continue our coverage of all JavaScript's key fundamental features, turning our attention to commonly-encountered types of code blocks such as

# Client-side web development

- **HTML:**
  - structure of content
- CSS (cascading style sheets):
  - presentation
- Javascript
  - scripting language
- DOM (document object model):
  - hierarchical representation of webpage
- SVG (scalable vector graphics):
  - 2D graphical objects and methods

# Client/server model



<http://www.visualbuilder.com/jsp/tutorial/introduction-to-jsp/>

# HTML

*boilerplate inserted by my Aquamacs editor:*

```
1 <!DOCTYPE HTML PUBLIC "-//IETF//DTD HTML//EN">
2 <html> <head>
3 <title></title>
4 </head>
5
6 <body>
7 <h1></h1>
8
9
10
11 <hr>
12 <address></address>
13 <!-- hhmts start --><!-- hhmts end -->
14 </body> </html>
```

- First line:
  - <!DOCTYPE HTML>
  - signifies HTML5
- Tags:
  - <tag> ... </tag>
  - html
  - head: title, style, javascript definitions etc.
  - body: body of the document
  - h1: heading level 1 (1-6)
  - address: contact information
- "self-closing" tags:
  - hr: horizontal rule
  - br: line break                      optional: <br/>
- optionally paired:
  - <p> .. </p>: paragraph
- comment:
  - <!-- ... -->

# HTML

- hypertext (link):
  - `<a href=URL>text</a>` (text presented in blue)
- URL: uniform resource locator
  - Examples:
    - <http://sandiway.arizona.edu/>
    - <http://nlp.stanford.edu:8080/parser/>
    - <https://netid.arizona.edu/newid.php> (PHP)
    - <http://localhost/perl/test.pl> (mod\_perl program)
  - Format:
    - protocol://host(:port)/path
    - protocol://host(:port)/path?query
      - protocol = http (hypertext transfer protocol)
      - port = TCP/IP port number

# HTML

- Images:

- `<img src=URL>`

- attribute: src

(required)

- value: URL (or filename etc.)

(jpg, gif, png supported, see note below)

- attribute: alt

(supposed to be required)

- value: text

- attribute: height

- value: pixels

- attribute: width

- value: pixels

- attribute: align

(not in HTML5)

- value: top | bottom | middle | left | right

- Can embed:

- `<a href=URL><img src=URL></a>`

- **Note:** [http://en.wikipedia.org/wiki/Comparison\\_of\\_web\\_browsers#Image\\_format\\_support](http://en.wikipedia.org/wiki/Comparison_of_web_browsers#Image_format_support)

# HTML

- Images can be embedded inside the file via base64 encoding:

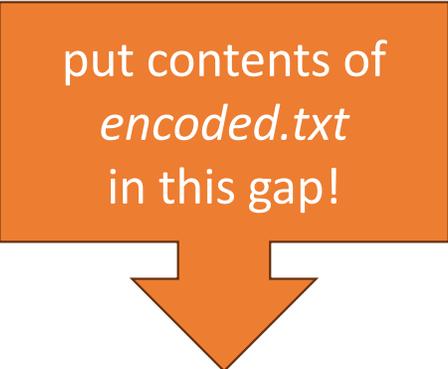
```

```



# HTML

- On Ubuntu:
  - `base64 imagefile > encoded.txt`
- macOS:
  - `base64 -i imagefile -o encoded.txt`
- base64 in Windows:
  - `certutil -encode imagefile encoded.txt`
- HTML file:
  - ``



put contents of  
*encoded.txt*  
in this gap!

# HTML

- Example (macOS):

```
$ ls -l sandiway.png
```

```
-rw-r--r--@ 1 sandiway  staff  158266 Sep 25 19:45 sandiway.png
```

```
$ base64 -i sandiway.png -o encoded.txt
```

```
$ ls -l encoded.txt
```

```
-rw-r--r--  1 sandiway  staff  211025 Sep 25 19:47 encoded.txt
```

# HTML

```
sandiwai@sandiwai-XPS-15-9570: ~/Desktop
GNU nano 6.2 test.html *
<html>
<head></head>
<body>

sWLUWHRyTUw6Y29tLmFkb2JlLnhtcAAAAAAPD94cGFja2V0IGJlZ2luPSLvu78iIGlkPSJXNU0w
TXBDZWhpSHpyZVN6TlRjemtjOWQiPz4gPHg6eG1wbWV0YSB4bWxuczp4PSJhZG9iZTpuZCptZXRh
LyIgeDp4bXB0az0iQWRvYmUgWE1QIENvcmUgOS4xLWwMwMDEGnzkuYThkNDc1MzQ5LCAyMDIzLzAz
LzIzLzEz0jA10jQ1ICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIC
b3JnLzE5OTkvMDIvMjItcmRmLXN5bnRheC1ucyMiPiA8cmRm0kRl c2NyaXB0aW9uIHJkZjphYm91
dD0iIiB4bWxuczp4bXA9Imh0dHA6Ly9ucy5hZG9iZS5jb20veGFWLzEuMC8iIHhtbG5z0mF1eD0i
aHR0cDovL25zLmFkb2JlLnNvbS9leGlmLzEuMC9hdXgvIiB4bWxuczp4bWV0dHA6Ly9j
aXBhLmpwL2V4aWYvMS4wLyIgeG1sbnM6cGhvdG9zaG9wPSJodHRwOi8vbnMuYWRvYmUuY29tL3Bo
b3Rvc2hvcC8xLjAvIiB4bWxuczp4bXBNTT0iHR0cDovL25zLmFkb2JlLnNvbS94YXAvMS4wL21t
LyIgeG1sbnM6c3RfZnQ9Imh0dHA6Ly9ucy5hZG9iZS5jb20veGFWLzEuMC9zVHlwZS9S9S9S9S9S
ZUV2ZW50IyIgeG1sbnM6c3RSZWY9Imh0dHA6Ly9ucy5hZG9iZS5jb20veGFWLzEuMC9zVHlwZS9S
ZXNvdXJjZVJlZiMiIHhtbG5z0mRjPSJodHRwOi8vbnMuYWRvYmUuY29tL2NhbWV5YS1yYXctc2V0dGluZ3MvMS4wLyIge
eG1sbnM6dGlmZj0iaHR0cDovL25zLmFkb2JlLnNvbS90aWZmLzEuMC8iIHhtbG5z0mV4aWY9Imh0
dHA6Ly9ucy5hZG9iZS5jb20vZXhpZi8xLjAvIiB4bXA6UmF0aW5nPSIwIiB4bXA6TW9kaWZ5RGF0
ZT0iMjAyMy050S09yNVQxOT0NT0N0c0wNzowMCIgeG1w0kNyZWF0ZURhdGU9IjIwMjMtMDktMDU
Mdc6NDg6NDIiIHhtcDpNZXRhZGF0YURhdGU9IjIwMjMtMDktMDUyMjAyMy050S09yNVQxOT0NT0N0c0wNzowMCIge
YXV40kxLbnM9IkvGNTBtbSBmLzEuNCBVU00iIGF1eDpMZW5zSU09IjE50CIgYXV40kxLbnNTZlZj
YXV40W1iZXI9IjAwMDAwMDAwMDAiIGF1eDpJbWFnZU51bWwJl cjo0iMCIgYXV40kZsYXNoQ292cGVu
c2F0aW9uPSIzLzEiIGF1eDpGaXJtd2FyZT0iMS4xLjAvIiB4bWV0dHA6Ly9ucy5hZG9iZS5jb20v
Wrote 2781 lines
^G Help      ^O Write Out     ^W Where Is      ^K Cut           ^T Execute       ^C Location
^X Exit      ^R Read File    ^N Replace       ^U Paste         ^J Justify      ^_ Go To Line
```

# HTML

- Other text element style tags (inline; semantic):
  - `<em> ... </em>` *italics*
  - `<strong> .. </strong>` **bold**
  - `<tt> ... </tt>` monospaced
  - `<code> ... </code>`
- Older style tags (specifies "look" or presentation):
  - `<b> ... </b>` **bold**
  - `<i> ... </i>` *italics*
- block-level:
  - `<pre> ... </pre>` preformatted

The **HTML `<pre>` element** represents preformatted text which is to be presented exactly as written in the HTML file. The text is typically rendered using a non-proportional ("[monospace](#)") font. Whitespace inside this element is displayed as written.

<https://developer.mozilla.org/en-US/docs/Web/HTML/Element/pre>

# HTML

HTML

CSS

```
1 <pre>
2   L           TE
3     A         A
4       C     V
5         R A
6         DOU
7         LOU
8         REUSE
9         QUE TU
10        PORTES
11       ET QUI T'
12      ORNE O CI
13     VILISÉ
14    OTE- TU VEUX
```

Output

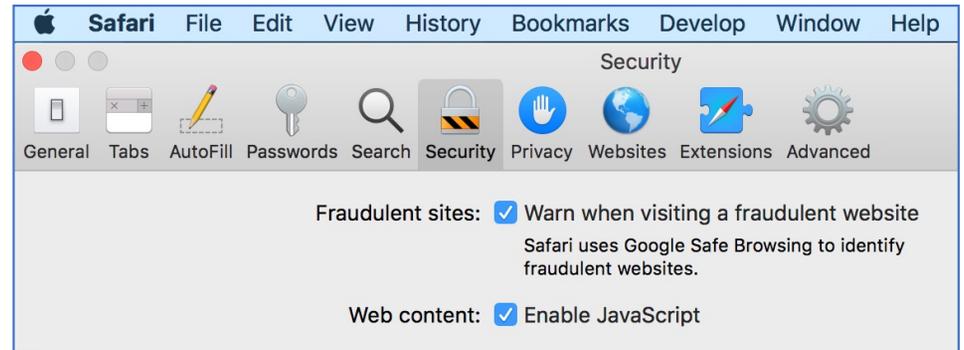
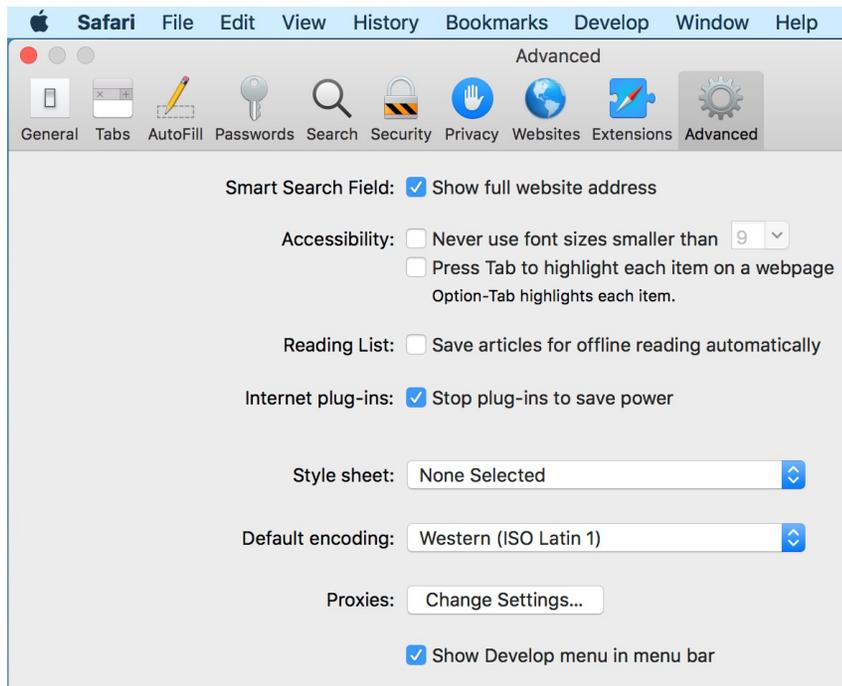
```
L           TE
A         A
  C     V
    R A
    DOU
    LOU
    REUSE
    QUE TU
    PORTES
ET QUI T'
ORNE O CI
VILISÉ
OTE- TU VEUX
LA   BIEN
SI   RESPI
      RER      - Apollinaire
```

# HTML

- Lists:
  - list item: `<li> ... </li>`
  - ordered lists: `<ol> ... </ol>`
  - unordered lists: `<ul> ... </ul>`
  - **note**: can be nested arbitrarily deep

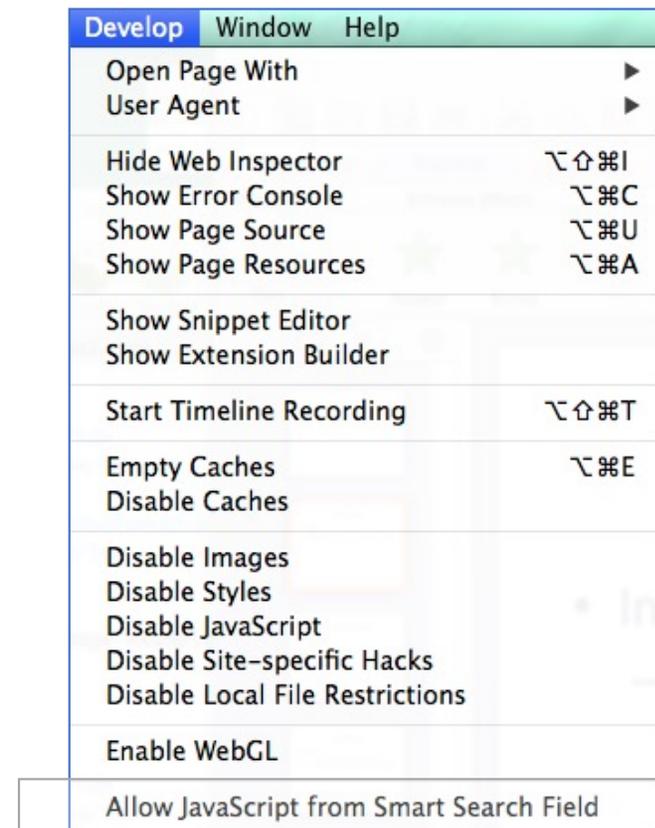
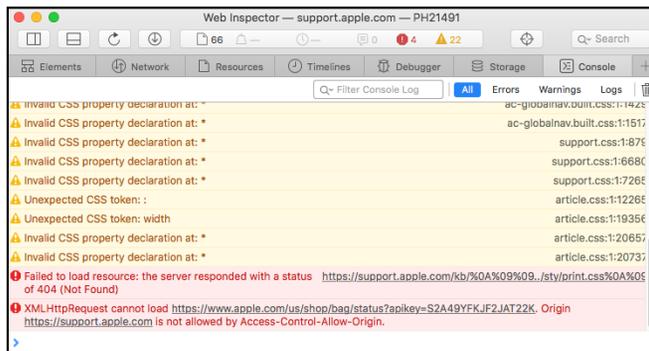
# Debugging

- In Safari:
  - Preferences > Advanced > **Show Develop menu in menu bar**



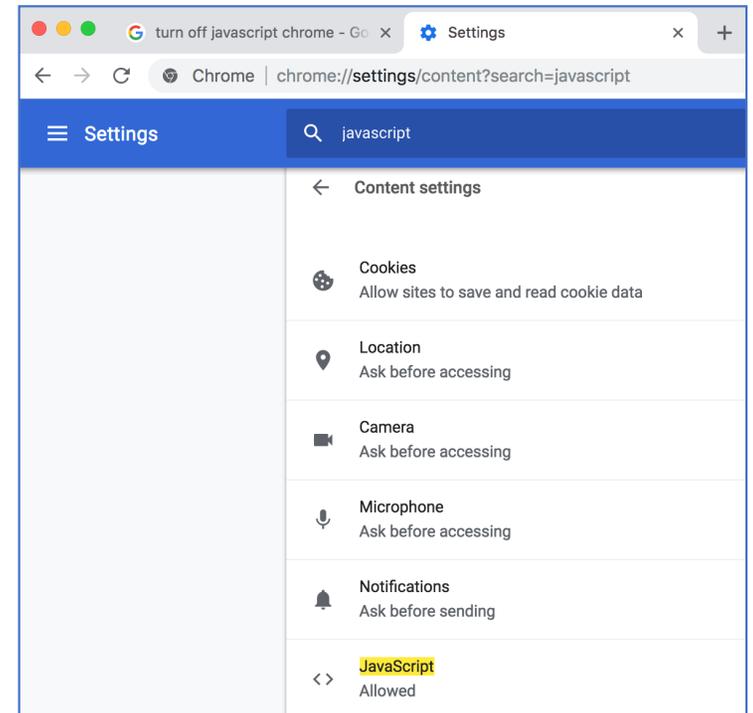
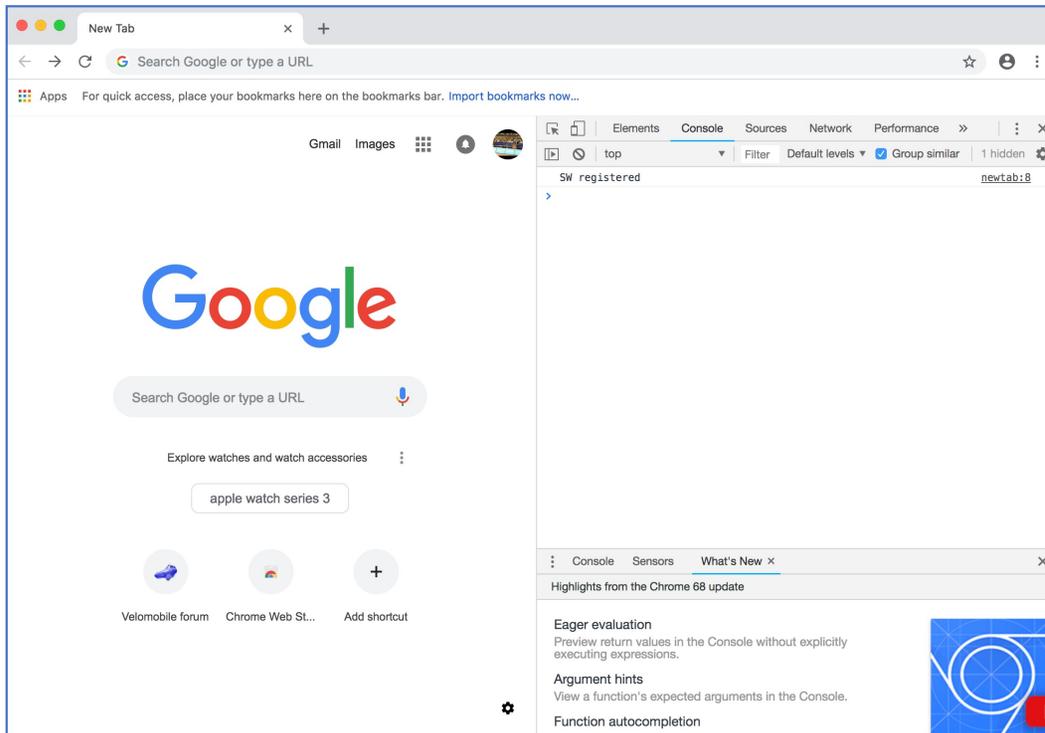
# Debugging

- In the Develop menu:
  - *Allow JavaScript from Smart Search Field*
    - **javascript:** ok in address bar
  - Show Page Source
  - Show Web Inspector



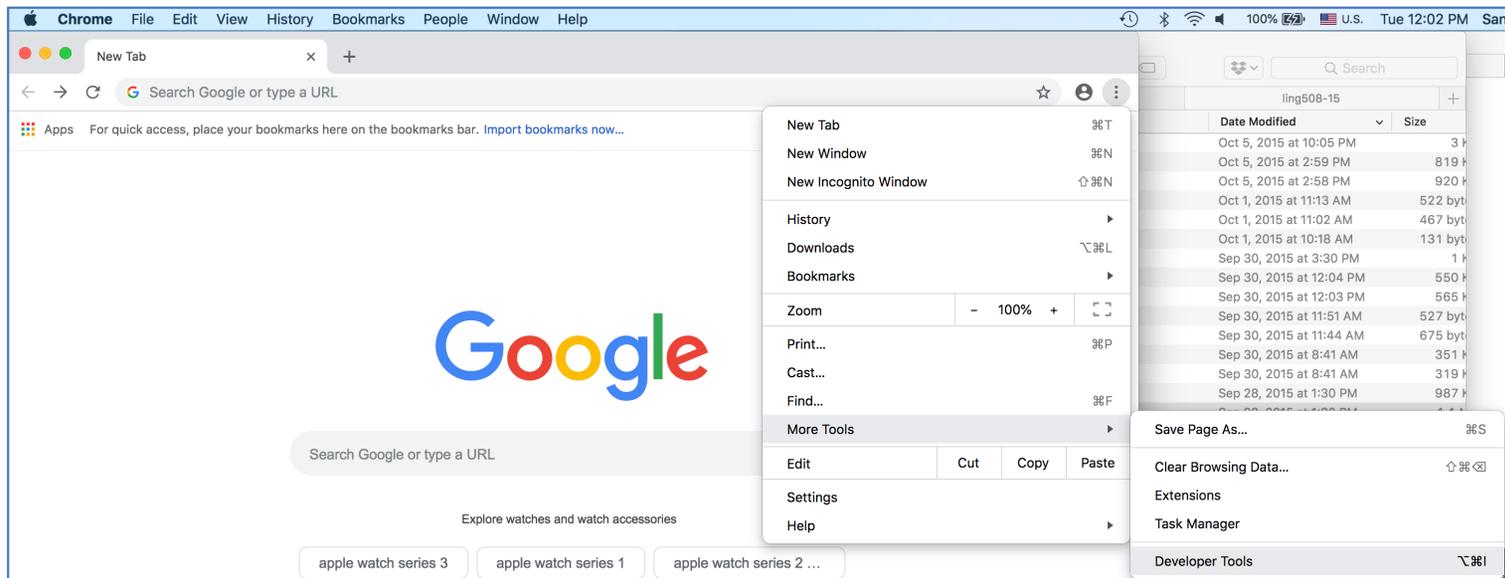
# Debugging

- Developer Tools and Javascript in Google Chrome:



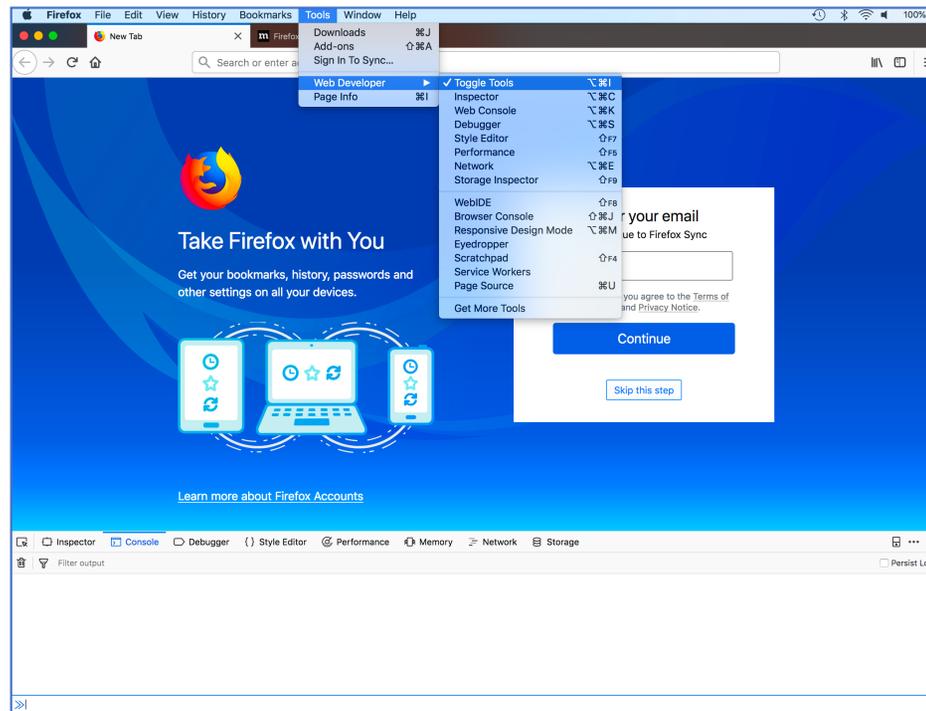
# Debugging

- In Google Chrome:



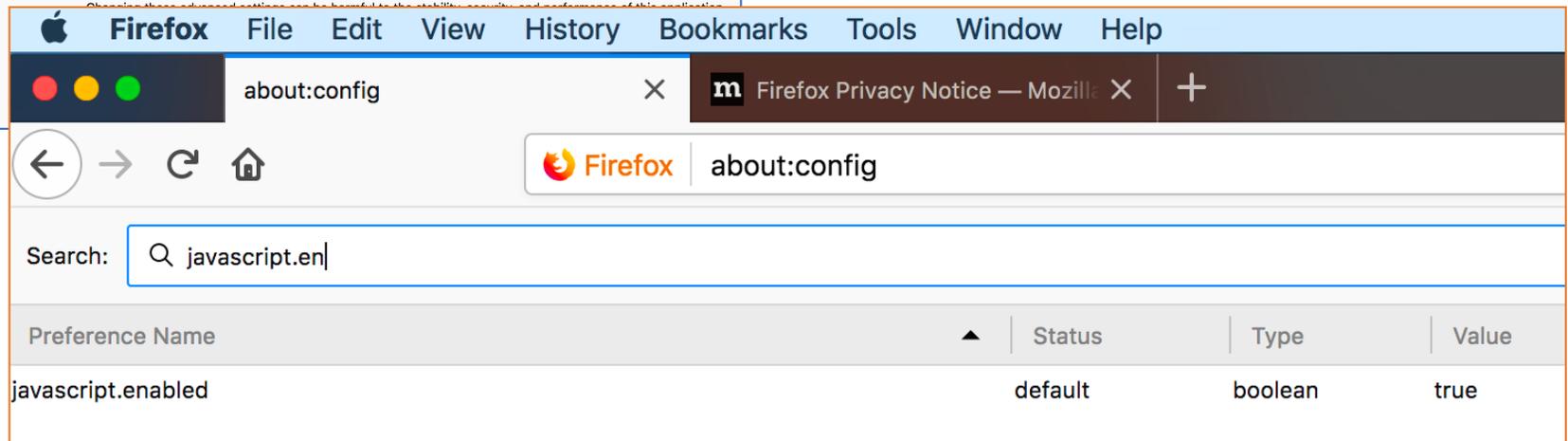
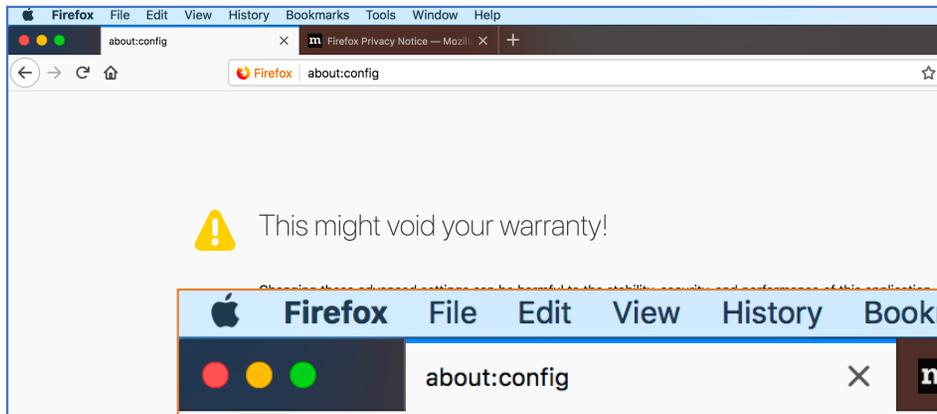
# Debugging

- Firefox:



# Debugging

- Firefox:



# Ungraded Homework Exercise

- Build your own html file.
- Play with the tags
- Embed a picture of yourself encoded in base64