

CISC 3120

C23: The Languages of the Web

Hui Chen

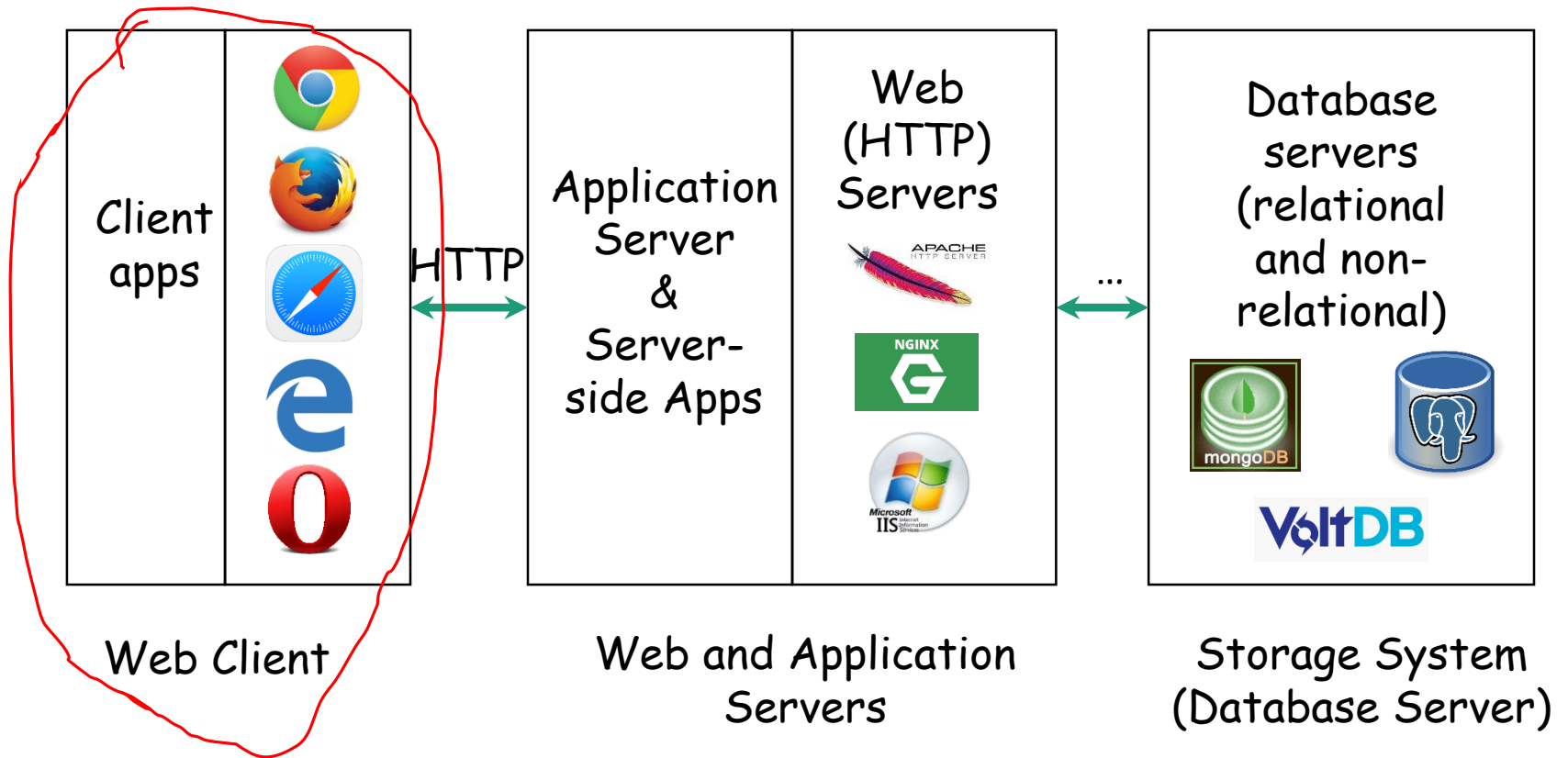
Department of Computer & Information Science

CUNY Brooklyn College

The Languages of the Web

- XML and HTML
- CSS
- JavaScript

Web Application Architecture



Markup language

- Directive and content
 - Directive describe content or influence presentation
 - Example: `<i>this is italic</i>` where `<i></i>` is the directive
- Example markup languages
 - eXtensible Markup Language (XML)
 - Hypertext Markup Language (HTML)
- Write document in Marked language
 - Start with content, annotate content with directives or tags

HTML Tags

- HTML uses `<>` to indicate a tag
- Tags can provide the following
 - Formatting information, e.g., `<i>`, ``, ``
 - Meaning of content
 - `<h1>` means level 1 heading
 - `` unordered list, `` a list item
 - `` ordered list, `` a list item
 - `<p>` means paragraph
 - Type of information, `` image to display
 - Tags can be nested

Example: Writing HTML Document

- Starting with content, annotate with tags

Class HttpURLConnection

AURLConnection with support for HTTP-specific features. See the spec for details.

Each HttpURLConnection instance is used to make a single request but the underlying network connection to the HTTP server may be transparently shared by other instances.



```
<h1>Class HttpURLConnection</h1>
```

```
<p>AURLConnection with support for HTTP-specific features. See the spec for details.</p>
```

```
<p>Each HttpURLConnection instance is used to make a single request but the underlying network connection to the HTTP server may be transparently shared by other instances.</p>
```

HTML and XHTML

- Important versions of HTML
 - HTML 2.0, 3.2, 4, 4.01, 5, and 5.1
- HTML 4 or earlier: application of SGML
 - Syntax is less restrictive
- HTML 5 or later: application of XML
 - Syntax is more restrictive
 - Consideration: efficiency, uniformity

Example: HTML 5 Document

- Add required DOCTYPE and head fields and values

```
<!DOCTYPE html>                                <!-- required by HTML 5 -->
<html lang="en">                                <!-- this is a comment -->
<head>
  <title>Example HTML 5: HttpURLConnection</title> <!-- required by HTML 5 -->
  <meta charset="utf-8" />                       <!-- required by HTML 5 -->
</head>
<body>
<h1>Class HttpURLConnection</h1>

<p>A URLConnection with support for HTTP-specific features. See the spec for details.</p>

<p>Each HttpURLConnection instance is used to make a single request but the underlying
network connection to the HTTP server may be transparently shared by other instances.
</p>
</body>
</html>
```


Validate HTML Document

- Always validate your HTML documents
 - Benefits: for improving parsing efficiency, rendering uniformity, and learning
- Example
 - W3C Markup Validation Service
 - Total Validator

Cascading Style Sheets

- How should a markup be rendered?
 - Example: font, font size, and color of the content of a `<h1>` tag
- CSS defines "styles" of documents
 - Initial motivation: separate content from presentation

Style Sheet and Rules

- A style sheet contains one or more rules
- Each rule consists of
 - A selector
 - A declaration block
 - That consists of in turn a list of property-value pairs

Example: CSS Rule

- Question:
 - What is the selector of this rule?
 - What is the declaration body of this rule?
 - How is a property-value pair is written?
 - What does it mean that a property has a list of values?

```
h1 {  
  font-family: Tahoma, Arial, sans-serif;  
  font-size: 12pt;  
  color: black;  
  background: white;  
}
```

Some CSS Selectors and HTML

| CSS Selector | CSS Example | HTML Example |
|--|---|---|
| Type selector: tag name | <pre>p { color: blue;}</pre> | <pre><p>Hello, World!</p></pre> |
| Class selector: class attribute | <pre>.highlight { color: red; font-weight: bold; }</pre> | <pre><p class=highlight>Hello, World!</p> <h1 class=highlight>Table of Content</h1></pre> |
| Type + Class: tag name + class attribute | <pre>p.highlight { color: red; font-weight: bold; }</pre> | <pre><p class=highlight>Hello, World!</p></pre> |
| ID selector: id value | <pre>#main_content {color: black;}</pre> | <pre><div id=#main_content> </div></pre> |

Some CSS Pseudo Selectors

- Typically associated with an action or a state
- `hover`: selected when the mouse is hovering on the element
- `link` and `visited`: whether a link is not visited or visited

Example: Pseudo Selectors

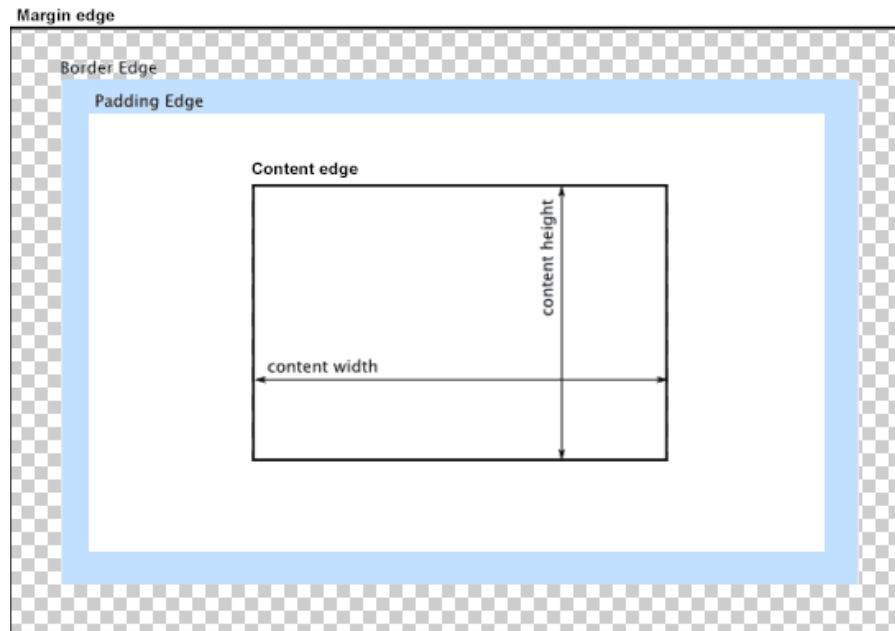
```
p:hover, a:hover /* selectors can be a list */ {  
  font-family: Tahoma, Arial, sans-serif;  
  font-size: 12pt;  
  color: blue;  
  background: white;  
}  
a.link {  
  color: blue;  
}  
a.visited {  
  color: brown;  
}
```

CSS Properties

- See [MDN CSS Properties reference](#)
- Example categories:
 - Color
 - Size
 - Position
 - Visibility

CSS Box Model

- Each element is represented as a rectangular box (See [MDN Box Model](#))



CSS Length Units

- See [MDN Length](#)
- Examples
 - px: pixels
 - pt: printer point = 1/72 inch
 - mm: millimeter
 - in: inch
 - cm: centimeter
 - em: element's current font size

Size Properties

- width, height
- padding: padding-top, padding-right, padding-bottom, padding-left
- margin: margin-top, margin-right, margin-bottom, margin-left
- border: border-bottom-color, border-bottom-style, etc.
- See MDN

Position Property

- The position property controls how an element is positioned
- Values
 - static, relative, fixed, absolute
- See [MDN position](#)

Visibility

- The display property
 - Values:
 - none, inline, block
 - See [MDN display](#)
- The visibility property
 - Values:
 - hidden, visible
 - See [MDN visibility](#)

Fonts and Text Alignment

- Define font family, size, style, weight, etc.
 - See [MDN font](#)
- Define text alignment
 - See [MDN text alignment](#)

Color and Background

- See [MDN color](#)
- See [MDN background](#)

Add Styles to HTML Documents

- Inline: deprecated, do not use
- Document: embedded in document head, discouraged.
- External: linked in head, written a separate file

Example: Inline CSS

- Use the style attribute. Deprecated. Do not use.

```
<!DOCTYPE html>                                <!-- required by HTML 5 -->
<html lang="en">                                <!-- this is a comment -->
<head>
  <title>Example HTML 5: HttpURLConnection</title> <!-- required by HTML 5 -->
  <meta charset="utf-8" />                       <!-- required by HTML 5 -->
</head>
<body>
<h1 style="color: red;">Class HttpURLConnection</h1>

<p>A URLConnection with support for HTTP-specific features. See the spec for details.</p>

</body>
</html>
```

Example: Document CSS

- Use the style tag in HTML head. Discouraged to use.

```
<!DOCTYPE html> <!-- required by any XHTML -->
<html lang="en"> <!-- this is a comment -->
<head>
  <title>Example HTML 5: HttpURLConnection</title><!-- required for HTML 5-->
  <meta charset="utf-8" />
  <style type="text/css">
    h1 {color: red;}
  </style>
</head>
<body>
<h1>Class HttpURLConnection</h1>

<p>A URLConnection with support for HTTP-specific features. See the spec for details.</p>
</body>
</html>
```

Example: External CSS

- Use the link tag in HTML head. Preferred.
 - Styles written in files. Example below: style.css

```
<!DOCTYPE html> <!-- required by any XHTML -->
<html lang="en"> <!-- this is a comment -->
<head>
  <title>Example HTML 5: HttpURLConnection</title><!-- required for HTML 5-->
  <meta charset="utf-8" />
  <link type="text/css" rel="stylesheet" href="style.css"/>
</head>
<body>
<h1>Class HttpURLConnection</h1>
</body>
</html>
```

```
h1 {color: red; }
```

Validate CSS

- Always validate CSS
- Example
 - W3C CSS Validator (<https://jigsaw.w3.org/css-validator/>)

JavaScript

- Standardized as ECMAScript
- JavaScript: Core, Client, and Server
- Client-side
 - Collection of objects that support the control of a browser and interactions with users
 - Example: JavaScript + HTML: users inputs (keyboards or mouse clicks)
- Server-side
 - Collection of objects that make the language useful on a Web server
 - Example: communicate with a database server
 - Gaining momentum (e.g., node.js or <http://nodejs.org>)
- This lecture introduces client-side JavaScript

Writing JavaScript

- Syntax is somewhat similar to C/C++/Java
- Scripting language
 - Interpreted, dynamically typed.
 - Declare variable
 - Example: `var sum;`
 - Control structures
 - Selection and iterations are similar to C/C++/Java
 - Subroutines
 - Example: `function doSomething(i) { return i * 10;}`
 - Objects: unordered name-value pairs

Add JavaScript to HTML Document

- Use the script tag
- Inline or include as a separate file

Add JavaScript to HTML Document: Inline

```
<!DOCTYPE html> <!-- required by any XHTML -->
<html lang="en"> <!-- this is a comment -->
<head>
  <title>Example HTML 5: HttpURLConnection</title><!-- required for HTML 5-->
  <meta charset="utf-8" />
  <link type="text/css" rel="stylesheet" href="style.css"/>
</head>
<body>
<h1>Class HttpURLConnection</h1>
<p>A URLConnection with support for HTTP-specific features. See the spec for details.</p>
<script type="text/javascript">
  alert("Hello, World");
  document.write("<p>Hello, Word in the document</p>");
</script>
</body>
</html>
```

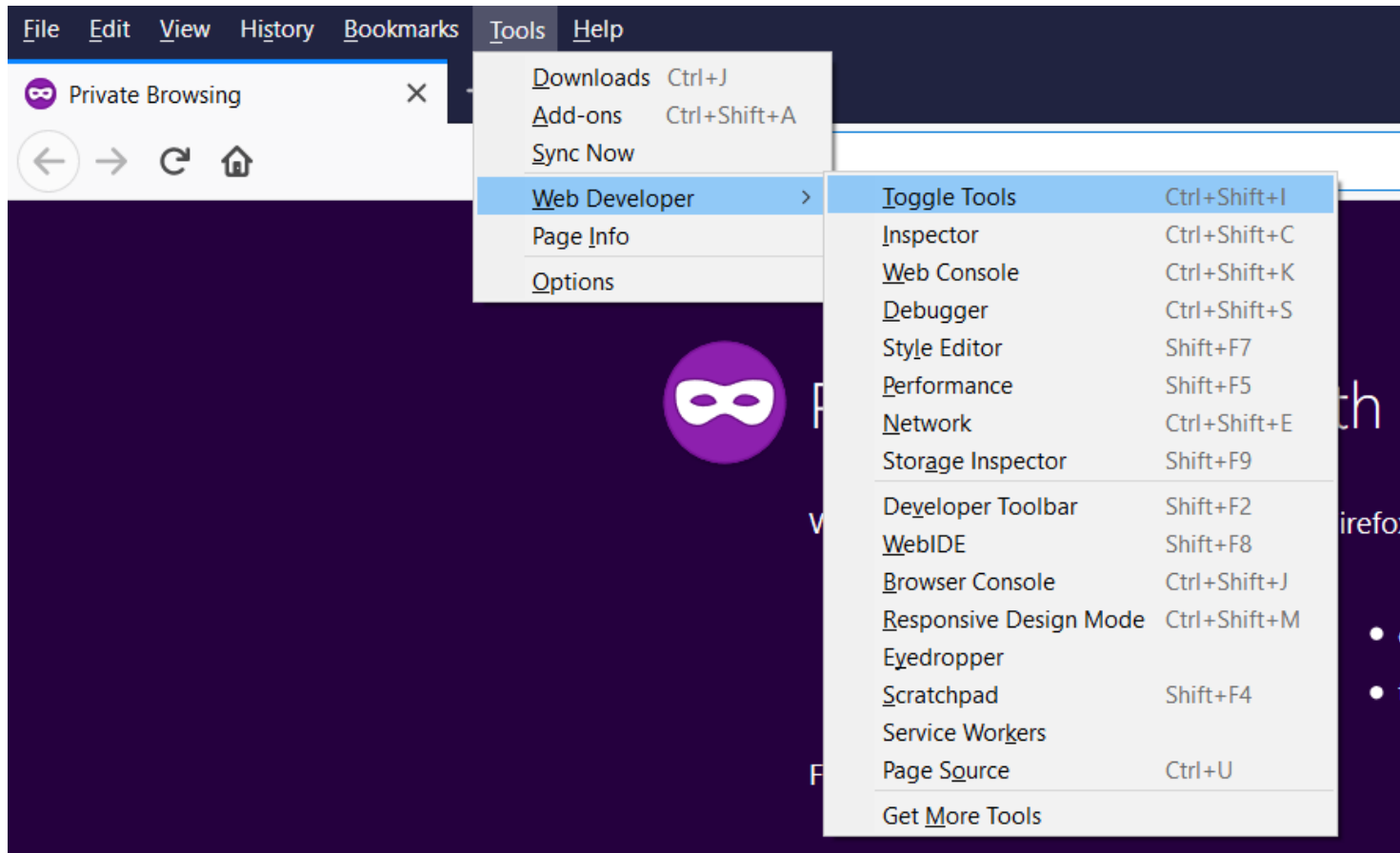

Add JavaScript to HTML Document: As a Separate File

- JavaScript is in helloworld.js

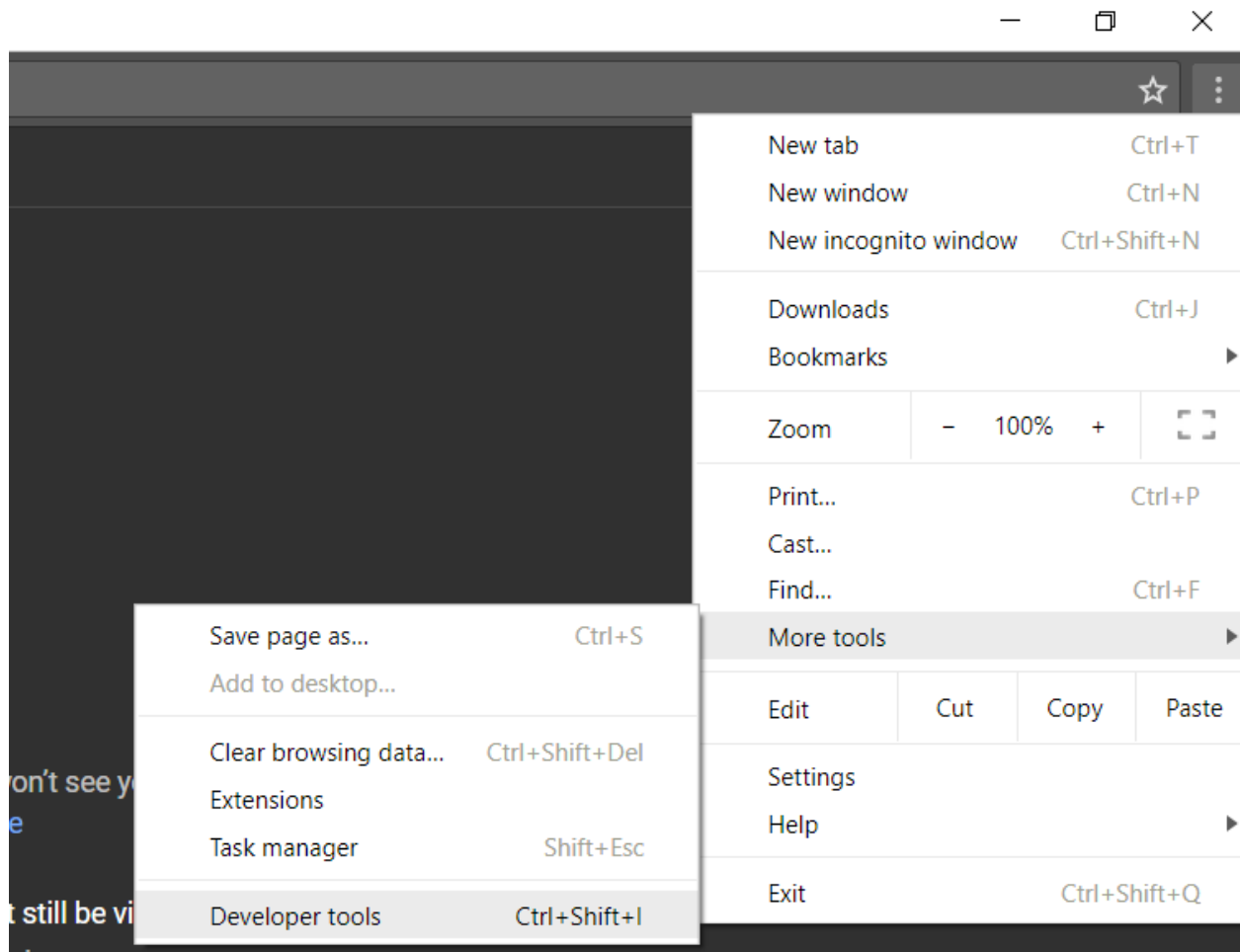
```
<!DOCTYPE html> <!-- required by any XHTML -->
<html lang="en"> <!-- this is a comment -->
<head>
  <title>Example HTML 5: HttpURLConnection</title><!-- required for HTML 5-->
  <meta charset="utf-8" />
  <link type="text/css" rel="stylesheet" href="style.css"/>
</head>
<body>
<h1>Class HttpURLConnection</h1>
<p>A URLConnection with support for HTTP-specific features. See the spec for details.</p>
<script type="text/javascript" src="helloworld.js"></script>
</body>
</html>
```

```
alert("Hello, World");
document.write("<p>Hello, Word in the document</p>");
```

Web Development Tools: Firefox

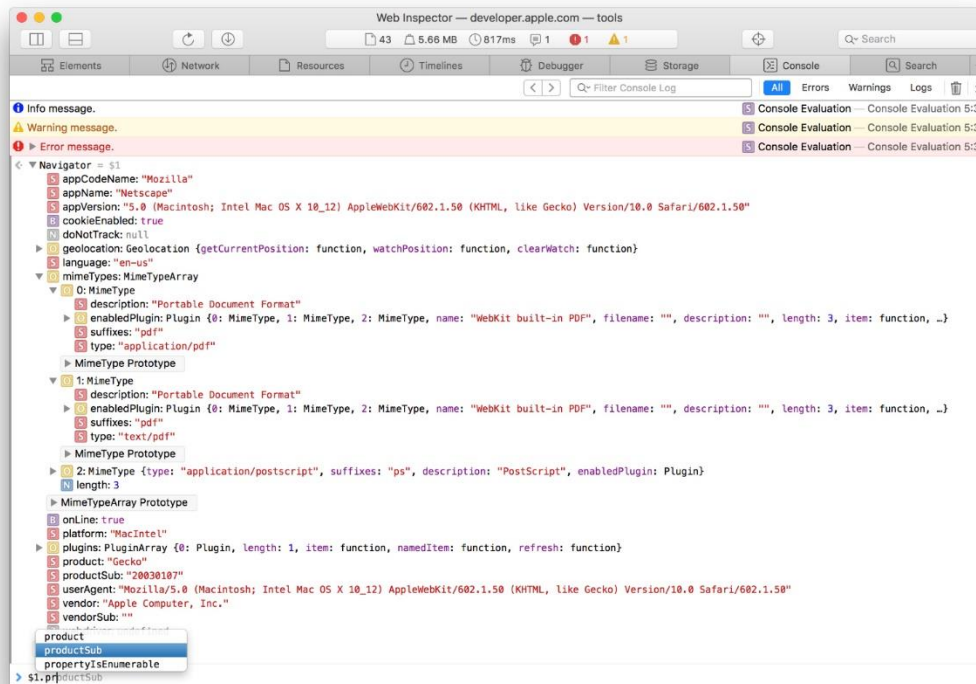


Web Development Tools: Chrome



Web Development Tools: Safari

- First go to Preferences, Advanced, and check the "Show Develop menu in menu bar".



Resources

- MDN tutorials
 - HTML: <https://developer.mozilla.org/en-US/docs/Web/Tutorials>
 - CSS: https://developer.mozilla.org/en-US/docs/Learn/Getting_started_with_the_web/CSS_basics
 - JavaScript: https://developer.mozilla.org/en-US/docs/Learn/JavaScript/First_steps

Questions?

- Markup language
- HTML
- CSS
- JavaScript
- Web development tools in modern browsers