Fundamentals of Web-Based Multimedia Communications:
Imagining the Internet's Interface

Introduction to JavaScript

Friday 10/14, 1:45-3:00pm
Smith Warehouse Bay 12 A228
CMAC 240L, CMAC 740L, ISS 240L, ISS740L, VMS288L, VMS788L

Introduction to JavaScript

JavaScript

What does it do?

- Modifies content

- Modifies visuals

- Modification can be based on user interaction, time, an automation, or another rule

- Also: extracts and stores data …the birth of Web 2.0

Brief History of Web 2.0
The Dot Com Bubble Burst, Y2K, and The War on Terror

- Bubble burst: The World Wide Web wasn't super profitable before the 2000s

  - pets.com site failed

  - eBay.com and amazon.com survived

- Y2K effect on datatypes

- Javascript and datatypes

- The War on Terror and extracting data "for security" (for profit)

  - *The Age of Surveillance Capitalism*, Shoshana Zuboff

JavaScript Fundamentals

Today we will learn:

- The DOM (who remembers what this is?)

- JavaScript Methods and Functions

- JavaScript Variables

- Javascript Arrays

- JavaScript Data Types

- Modifying HTML with JavaScript

JavaScript Fundamentals

By the end of the day, we will be able to read this:

HTML ▾

```html
<!DOCTYPE html>
<html>
<head>
<meta name="description" content="Javascript Selectors"
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width">
  <title>JS Selectors</title>
</head>
<body>
  <p>This paragraph is <em>outside</em> #div1</p>
  <div id="div1">
    <p>This is a paragraph in #div1</p>
    <p>This is another paragraph in #div1</p>
  </div>
</body>
</html>
```

JavaScript ▾

```javascript
// store the DOM element #div1 in variable myDiv
let myDiv = document.getElementById("div1");

// select all <p> elements and
//store as array in variable allPara
let allPara = document.getElementsByTagName("p");

//  when myDiv (#div1) is clicked
myDiv.addEventListener("click", function() {

  //set the background color of myDiv to cyan
  myDiv.style.background = "cyan";

  // set background of first <p> in array to orange
  allPara[0].style.background = "orange";

  // set background of 3rd <p> in array to yellow
  allPara.style.background = "yellow";
});
```
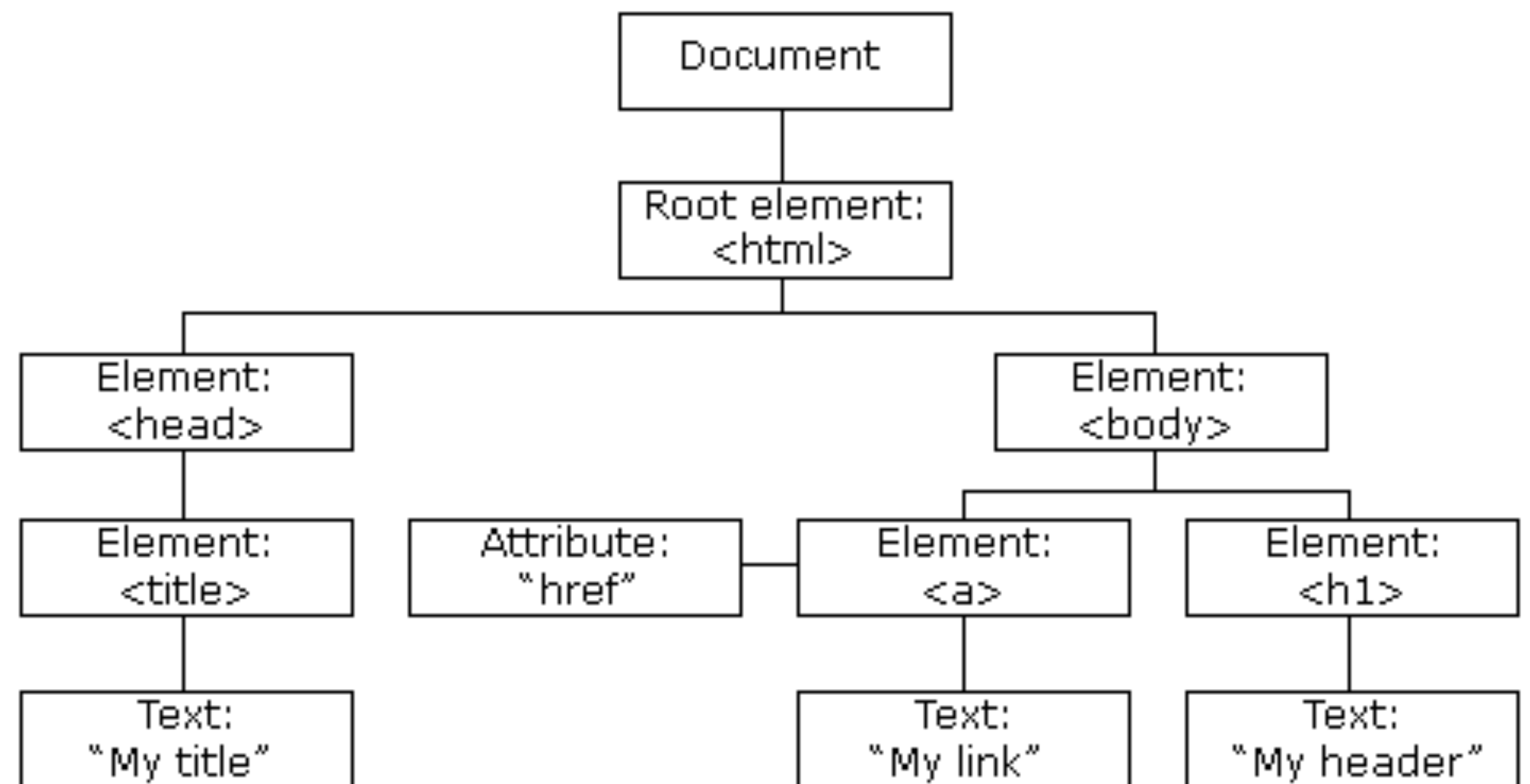
The HTML DOM (Document Object Model)
What is it?

- Represents HTML as objects

- It is an API (application programming interface, in contrast to a user interface)

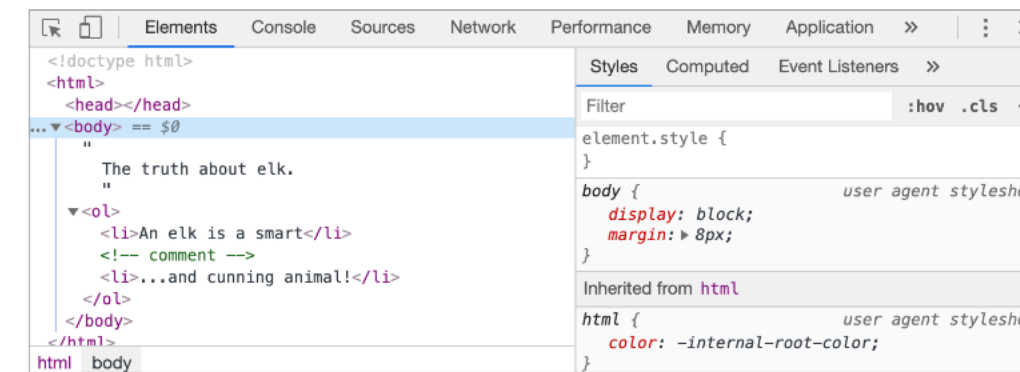- Allows JavaScript to access HTML

The HTML DOM (Document Object Model)

What is it?

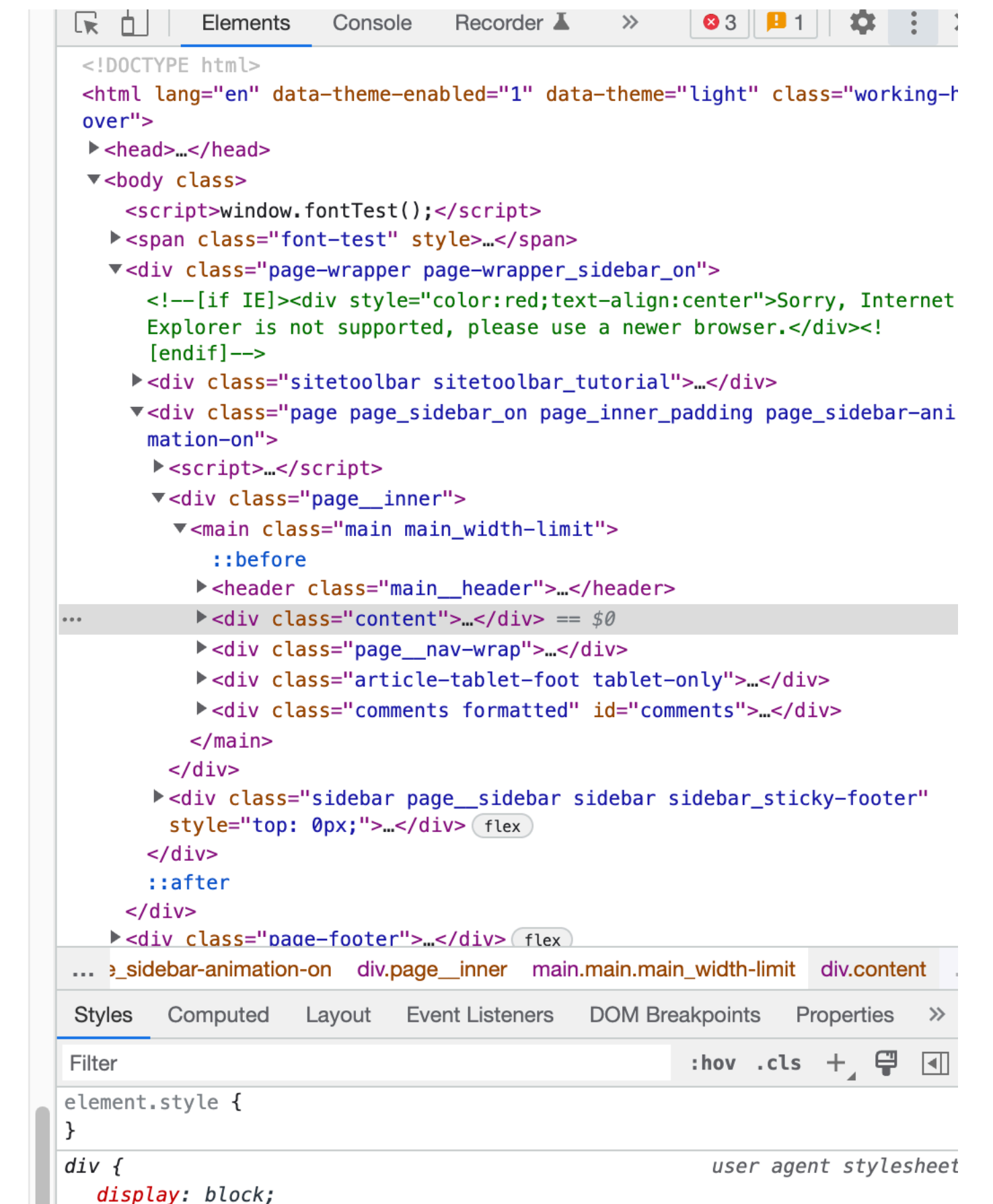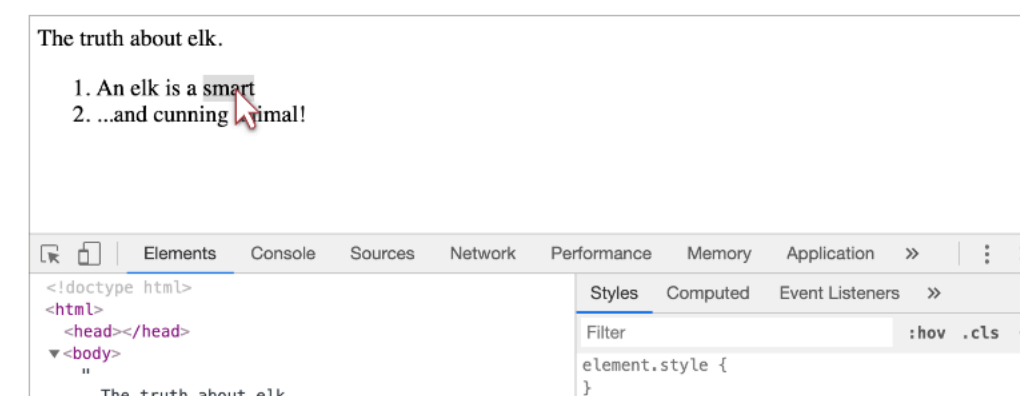- The "Elements" page when we inspect browsers is actually a simplified DOM!

You can see the DOM, click on elements, see their details and so on.

Please note that the DOM structure in developer tools is simplified. Text nodes are shown just as text. And there are no "blank" (space only) text nodes at all. That's fine, because most of the time we are interested in element nodes.

Clicking the ⌘ button in the left-upper corner allows us to choose a node from the webpage using a mouse (or other pointer devices) and "inspect" it (scroll to it in the Elements tab). This works great when we have a huge HTML page (and corresponding huge DOM) and would like to see the place of a particular element in it.

Another way to do it would be just right-clicking on a webpage and selecting "Inspect" in the context menu.

https://javascript.info/dom-nodes

JavaScript Methods
How do we access the HTML Objects in the DOM?

- document.getElementById

- document.getElementsByTagName

- document.getElementsByClassName

- document.querySelectorAll

JavaScript Variables
How do we assign names to data?

- A **variable** is **named storage for data**.

- You can declare a variable by:

  - Using **var** (older)

  - Using **let**

  - Using **const** (short for constant, if the variable value should not change).

  - Using nothing

- **let x = 1;** or **let myNumber = 2.5;**

- **(you can name a variable anything, but make sure a variable name makes sense to you)**

- let allPara = document.getElementsbyTagName("p");

- ..but what if there are multiple paragraphs?

JavaScript Arrays

How do we deal with multiple values in a variable?

- let allPara = document.getElementsbyTagName("p");

- Creates an array of paragraphs **allPara[]** depending on the number of paragraphs in the HTML

- **allPara[0]** selects the first paragraph

- **allPara[1]** selects the second paragraph… and so on

Remember "0" indexes the first item in a data collection!

JavaScript Data Types
The 7 basic data types of JavaScript

- A data type is a set of possible values and a set of allowed operations on it

- There are 7 basic data types in JS:

  1. **Number:** for numbers of any kind: integer (-1, 24, 0) or floating-point (2.343, 1.0, 3.14159265). **let x = 1;** or **let x = 1.5**;

  2. **String:** for characters or strings of characters (**let x = "Sam";** or "My name is Sam." or "the creepy and specific identification of your location stored as a string such as 123 Rainbow dr")

  3. **Boolean:** for true or false

  4. **Null:** a special value which represents "nothing", "empty": **let x = null;**

  5. **Undefined:** for unassigned values (e.g. variables declared but not defined) **let x; let x;** or **let x = [ ];** for an undeclared array)

  6. **Object:** for more complex data structures (object-oriented programming) **const car = {type:"Fiat", model:"500", color:"white"};**

  7. **Symbol (new):** token that serves as unique IDs **var symbol1 = Symbol("prop");**

JavaScript Data Types

Name the variable declaration and data type!

- What is **let firstName = "Kim";** an example of?

- What is **let firstName = ["Kim", "Kylie," "Kourt", "Koko", "Kendall", "Kris"];** an example of?

- What is **const masonJars = 5;** an example of?

- What is **matissePrint = {color: "blue", type: "linocut", number: 2};** an example of?

JavaScript Fundamentals

After declaring variables and selecting the DOM, how do we modify the html?

- **let allPara = document.getElementsByTagName("p");**

- Assuming allPara is an array….

- **allPara[0].style.background = "orange";**

- …will turn the first paragraph orange on an HTML document

- **let myText = document.getElementsById("div1");**

- **myText.innerText = "hello there";**

- …will insert "hello there" as the only content in element with Id "div1"

Try it here:

https://jsbin.com/loqoyimeta/edit?html,js,output

https://www.w3schools.com/jsref/met_document_addeventlistener.asp