GENERAL ASSEMBLY

# JAVASCRIPT DEVELOPMENT

Sasha Vodnik, Instructor

## HELLO!

1. Pull changes from the `svodnik/JS-SF-9-resources` repo to your computer and open the `starter-code` folder in your code editor
2. Push your homework to the Homework repo and submit a pull request
3. **To submit your Slack bot project**, DM the URL of your Hubot repo on GitHub to Sasha

JAVASCRIPT DEVELOPMENT

# Intro to the DOM

## LEARNING OBJECTIVES

At the end of this class, you will be able to

- Identify differences between the DOM and HTML.
- Explain and use JavaScript methods for DOM manipulation.
- Create DOM event handlers to respond to user actions

## AGENDA

- Intro to the DOM
- Getting and setting DOM elements
- Responding to events

## WEEKLY OVERVIEW

| | |
|---|---|
| **WEEK 5** | Intro to the DOM / Intro to jQuery |
| **WEEK 6** | Advanced jQuery / Ajax & APIs |
| **WEEK 7** | Asynchronous JavaScript & Callbacks / Advanced APIs |

## HOMEWORK — GROUP DISCUSSION

EXERCISE

### TYPE OF EXERCISE

- Groups of 3

### TIMING

*6 min*

1. Show off your bot! What can it do?
2. Share a challenge you encountered, and how you overcame it.
3. If you tried something that didn’t work, or wanted to add functionality but weren’t quite sure how, brainstorm with your group how you might approach it.

## HOMEWORK — GROUP DISCUSSION

EXERCISE

**TYPE OF EXERCISE**

- Groups of 3

**TIMING**

*4 min*

1. Share your solutions for the objects homework and for the JSON homework.
2. Share a challenge you encountered, and how you overcame it.
3. Share 1 thing you found challenging. If you worked it out, share how; if not, brainstorm with your group how you might approach it.

## EXIT TICKET QUESTIONS

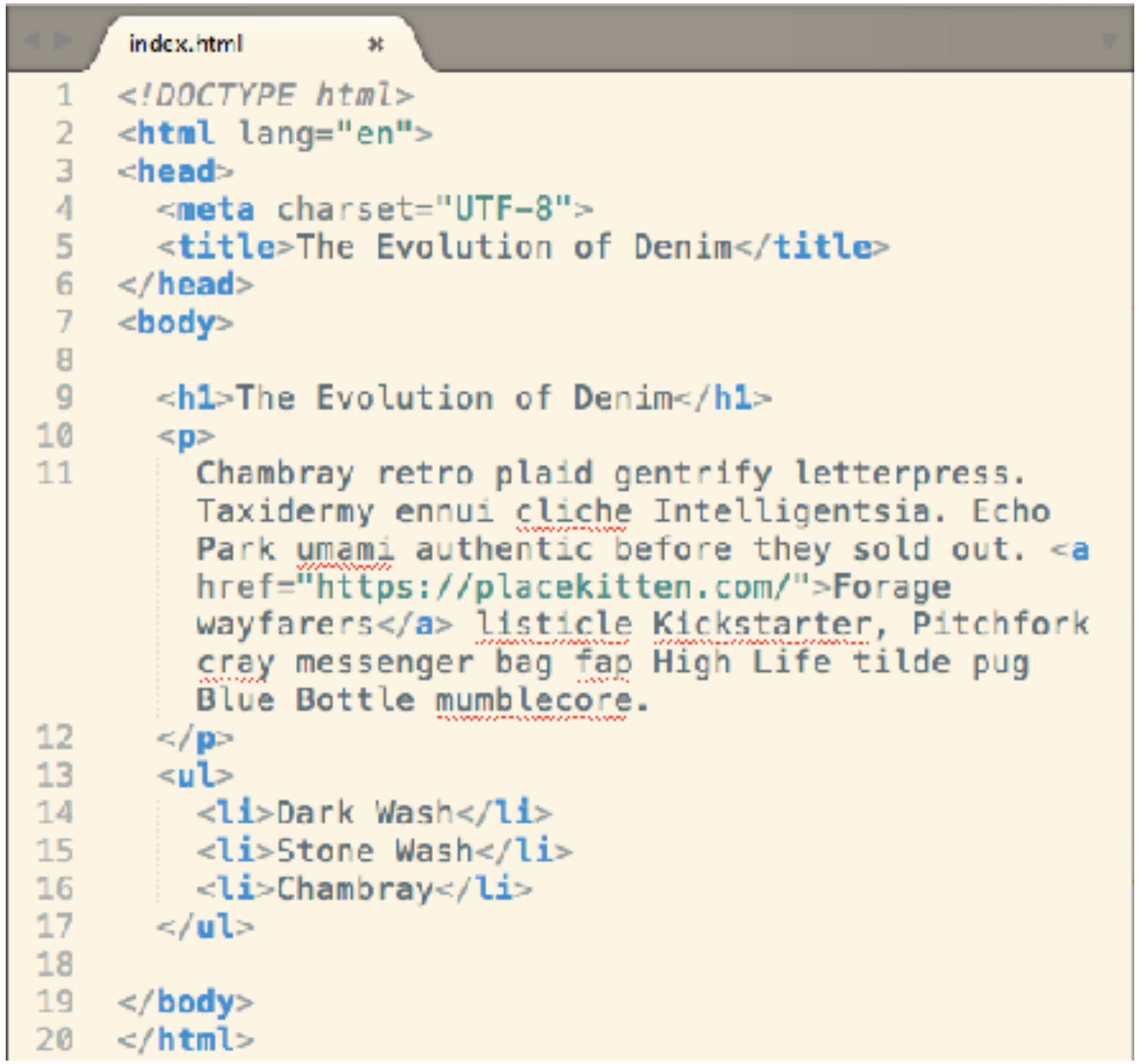
1. Does API only pull data from one site/app and put on your own or can they interact with each other?
2. There is a lot of terminology, I'm not sure I fully understand function vs. method vs. etc.
3. Would like more clarity on the utility of methods within objects.

## What CSS selectors select the highlighted string “orange” within this HTML code?

```
<html>
  <head>
    <title>Foods</title>
  </head>
  <body>
    <h1><img src=“images/apples.png” alt=“a wood bowl of red apples”></h1>
    <ul class=“foodsList” id=“fruitList”>
      <li class=“red”>apple</li>
      <li class=“orange”>orange</li>
      <li class=“yellow”>banana</li>
    </ul>
  </body>
</html>
```

## THE DOCUMENT OBJECT MODEL (DOM)

## DOM TREE — HTML FILE



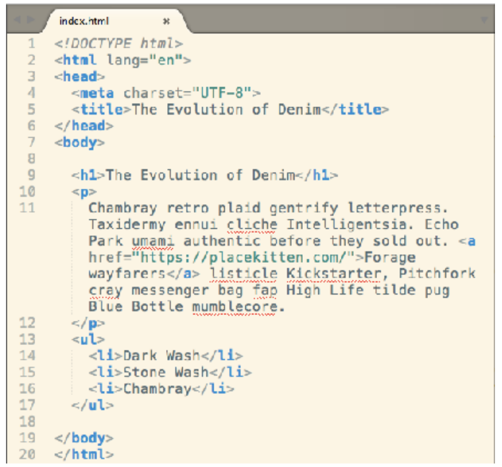
```html
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>The Evolution of Denim</title>
</head>
<body>

  <h1>The Evolution of Denim</h1>
  <p>
    Chambray retro plaid gentrify letterpress.
    Taxidermy ennui cliche Intelligentsia. Echo
    Park umami authentic before they sold out. <a
    href="https://placekitten.com/">Forage
    wayfarers</a> listicle Kickstarter, Pitchfork
    cray messenger bag fap High Life tilde pug
    Blue Bottle mumblecore.
  </p>
  <ul>
    <li>Dark Wash</li>
    <li>Stone Wash</li>
    <li>Chambray</li>
  </ul>

</body>
</html>
```

## DOM TREE

- The browser pulls in this HTML document, analyzes it, and creates an *object model* of the page in memory.
- This model is called the *Document Object Model (DOM)*.
- The DOM is structured like a tree, a DOM Tree, like in the model below:



```
<!DOCTYPE html>
<html lang="en">
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  <title>The Evolution of Denim</title>
</head>
<body>

  <h1>The Evolution of Denim</h1>
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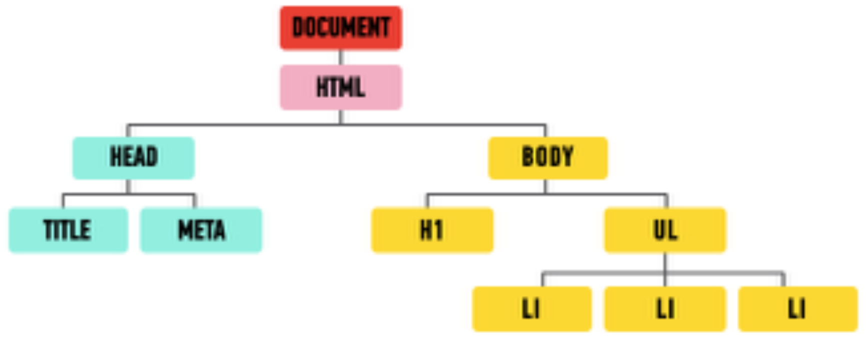
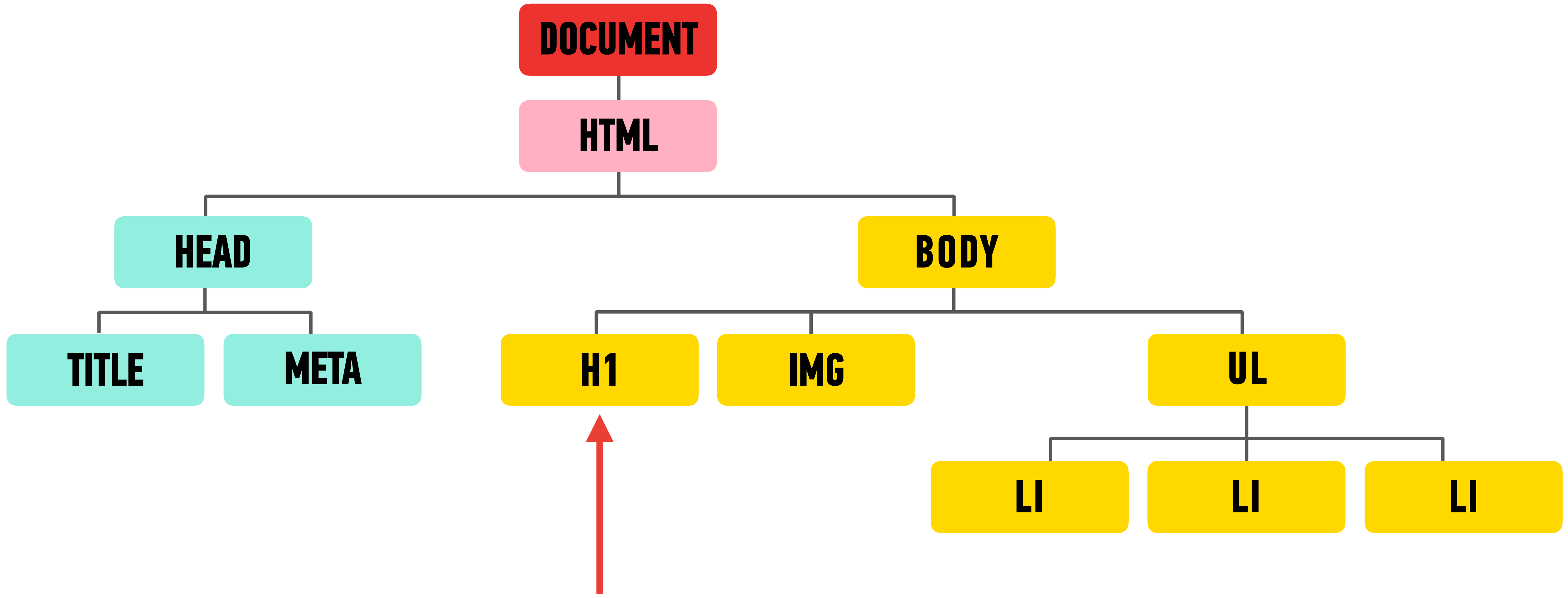
    cray messenger bag fap High Life tilde pug
    Blue Bottle mumblecore.
  </p>
  <ul>
    <li>Dark Wash</li>
    <li>Stone Wash</li>
    <li>Chambray</li>
  </ul>

</body>
</html>
```



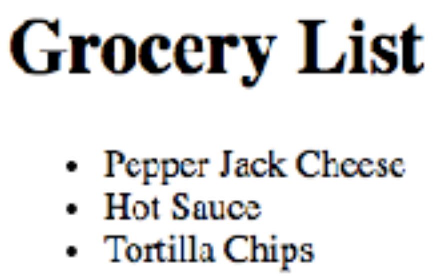
## DOM TREE



- Each element in the HTML document is represented by a *DOM node*.
- You can think of a node as a live object that you can access and change using JavaScript.
- When the model is updated, those changes are reflected on screen.

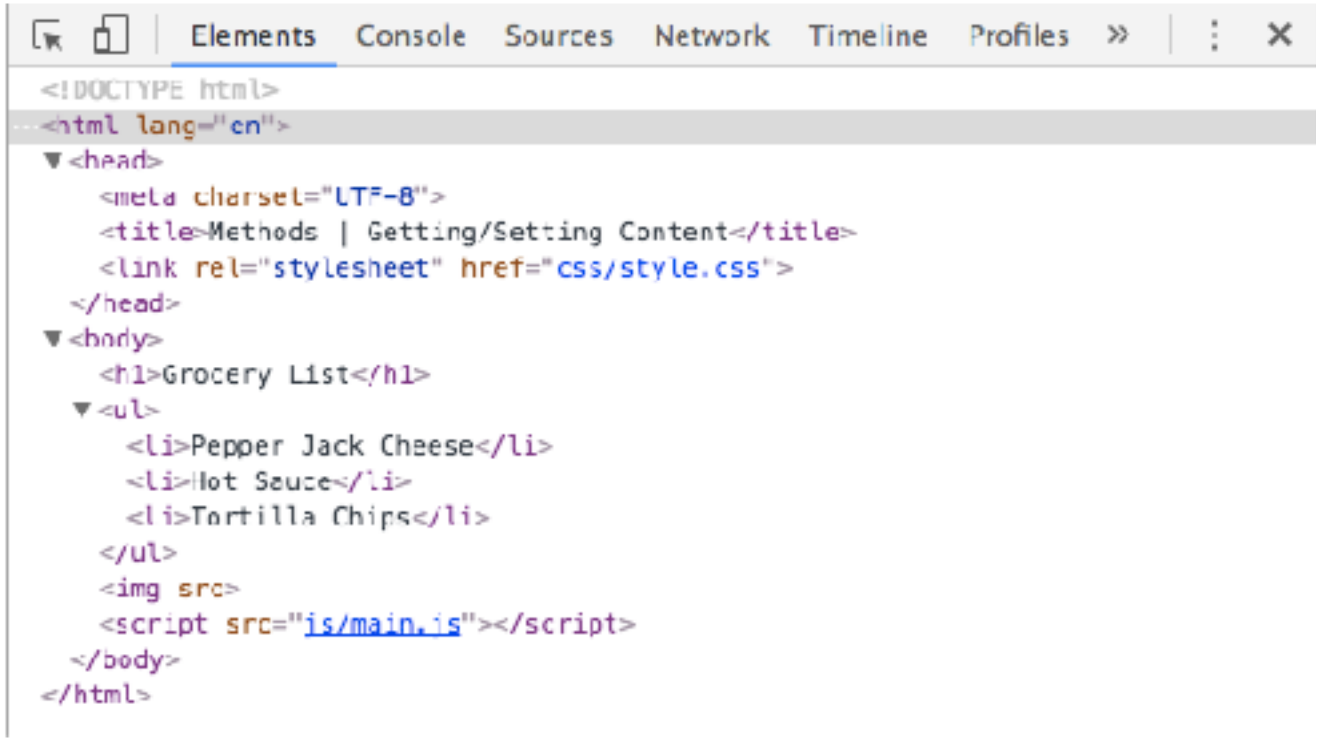
## DOM TREE

- In Chrome, you can go to View > Developer > Developer Tools and click on the Elements panel to take a look at the DOM tree.



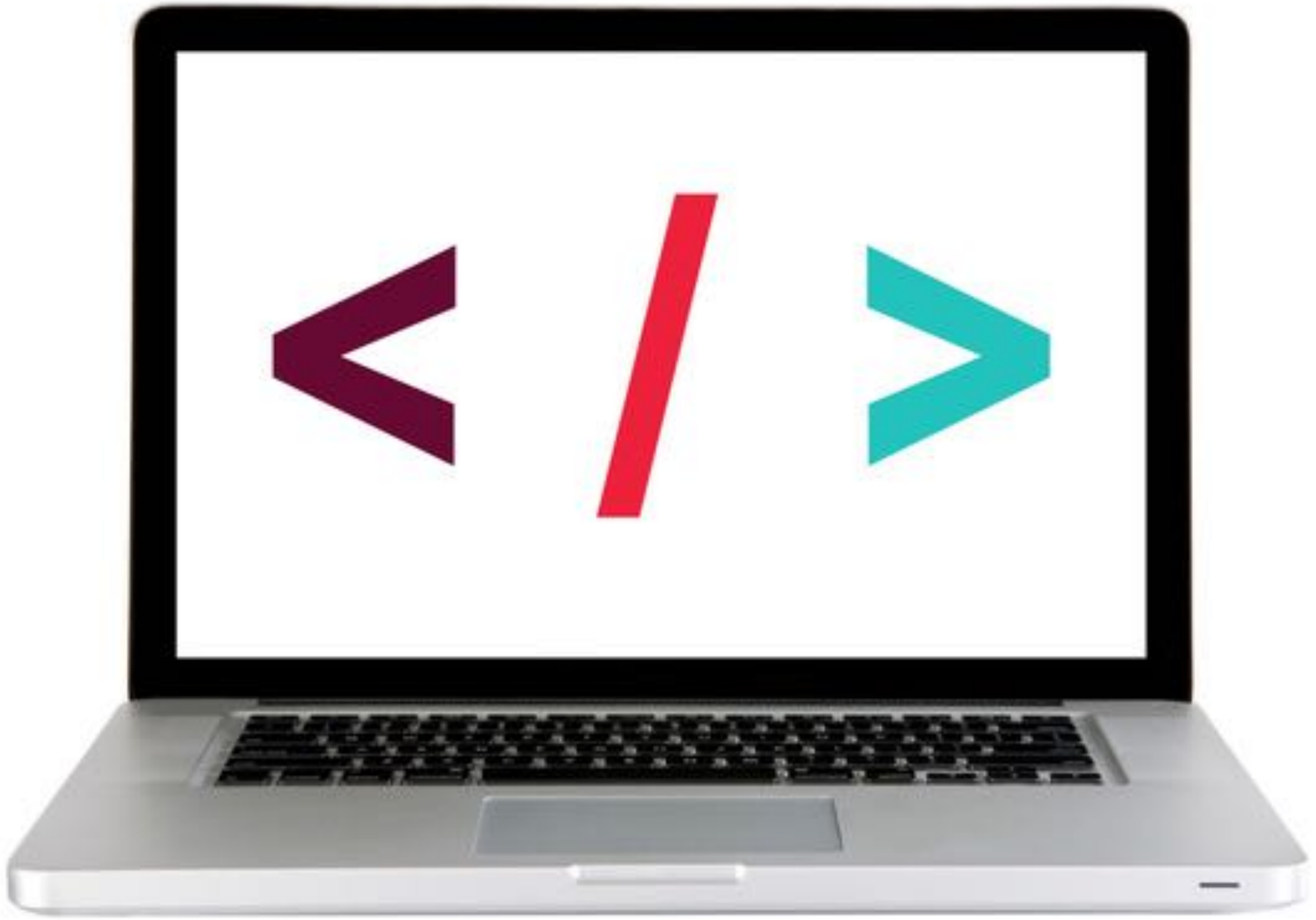
# Grocery List

- Pepper Jack Cheese
- Hot Sauce
- Tortilla Chips



```
<!DOCTYPE html>
<html lang="en">
▼<head>
   <meta charset="UTF-8">
   <title>Methods | Getting/Setting Content</title>
   <link rel="stylesheet" href="css/style.css">
 </head>
▼<body>
   <h1>Grocery List</h1>
  ▼<ul>
     <li>Pepper Jack Cheese</li>
     <li>Hot Sauce</li>
     <li>Tortilla Chips</li>
   </ul>
   <img src>
   <script src="js/main.js"></script>
 </body>
</html>
```

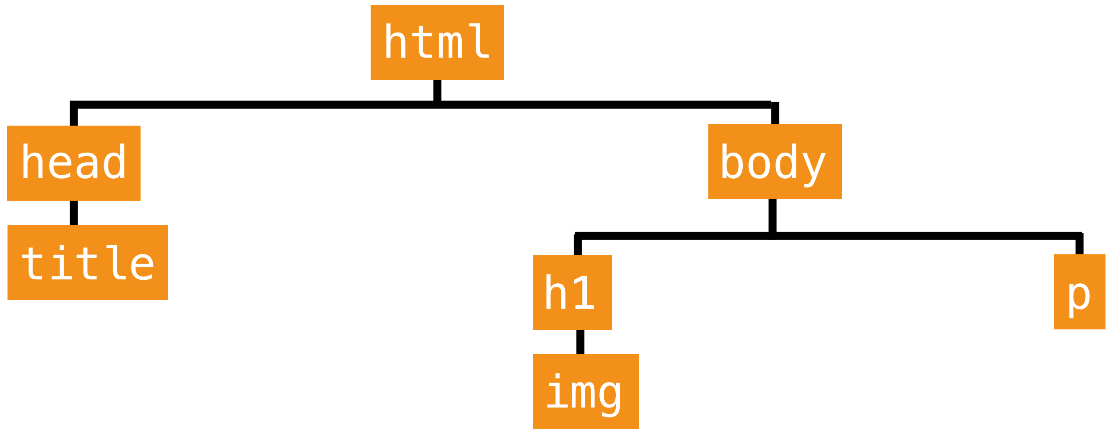
## LET'S TAKE A LOOK



## Web page elements

```
<html>
  <head>
    <title>JavaScript Basics</title>
  </head>
  <body>
    <h1>
      <img src="logo.png" alt="JS Basics">
    </h1>
    <p>First, master HTML and CSS.</p>
  </body>
</html>
```

## DOM Tree



## Web page elements

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  <body>
    <h1>
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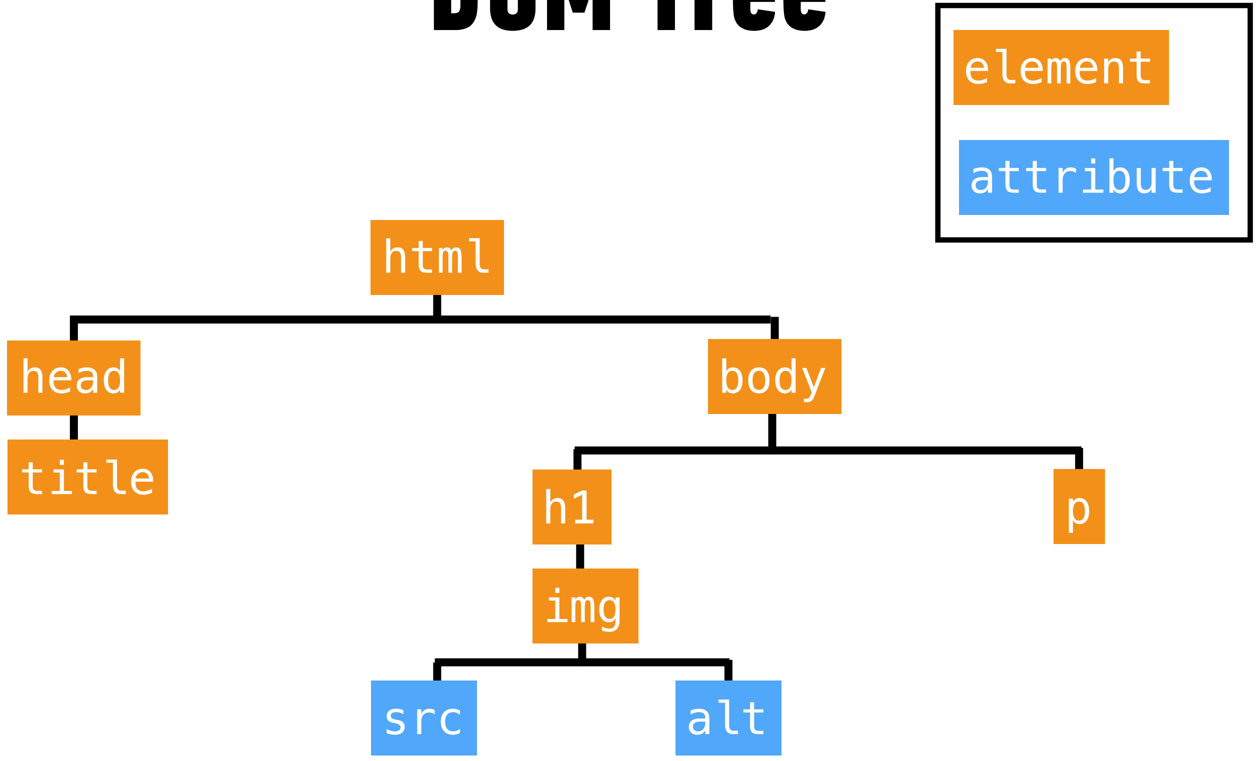
## DOM Tree



## Web page elements

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<html>
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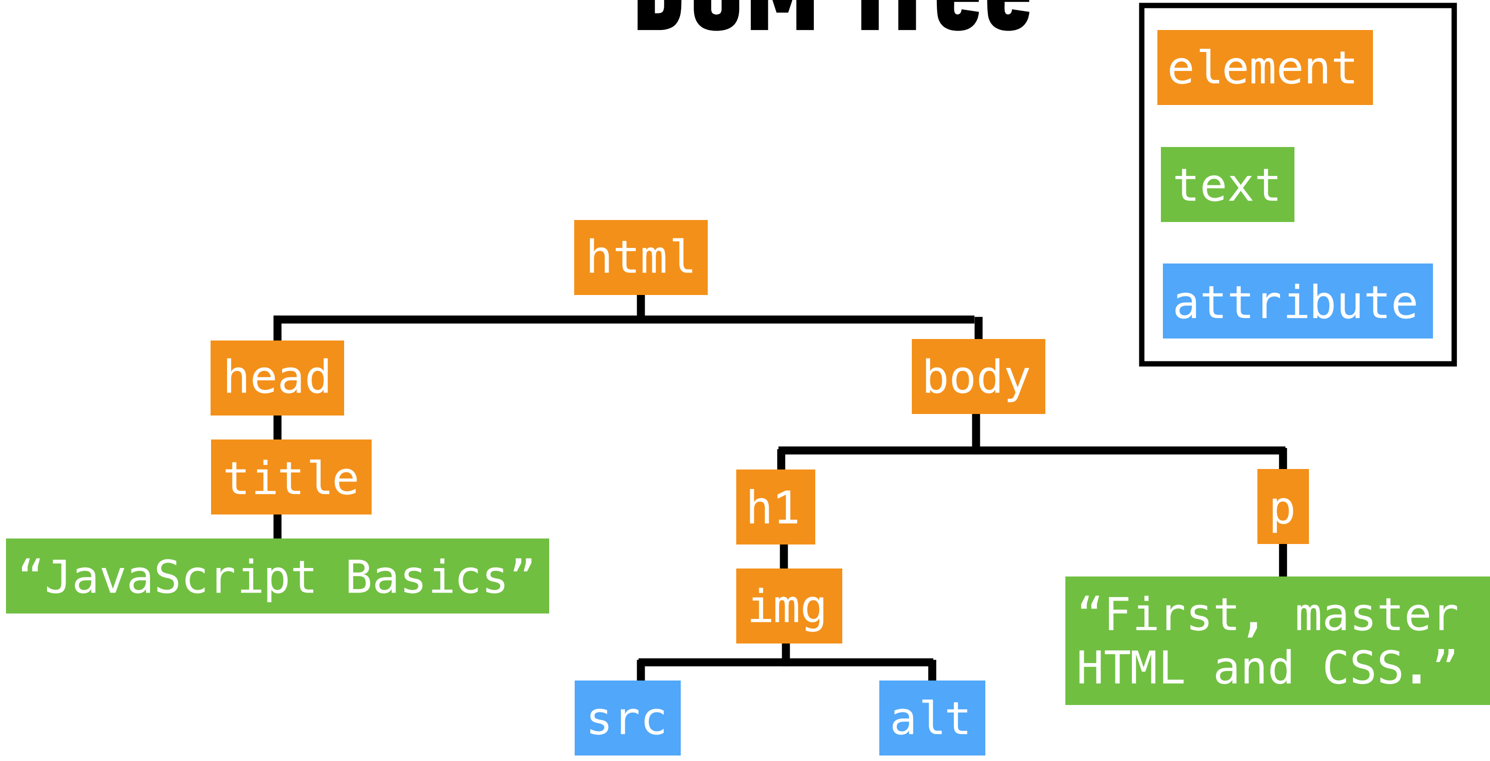
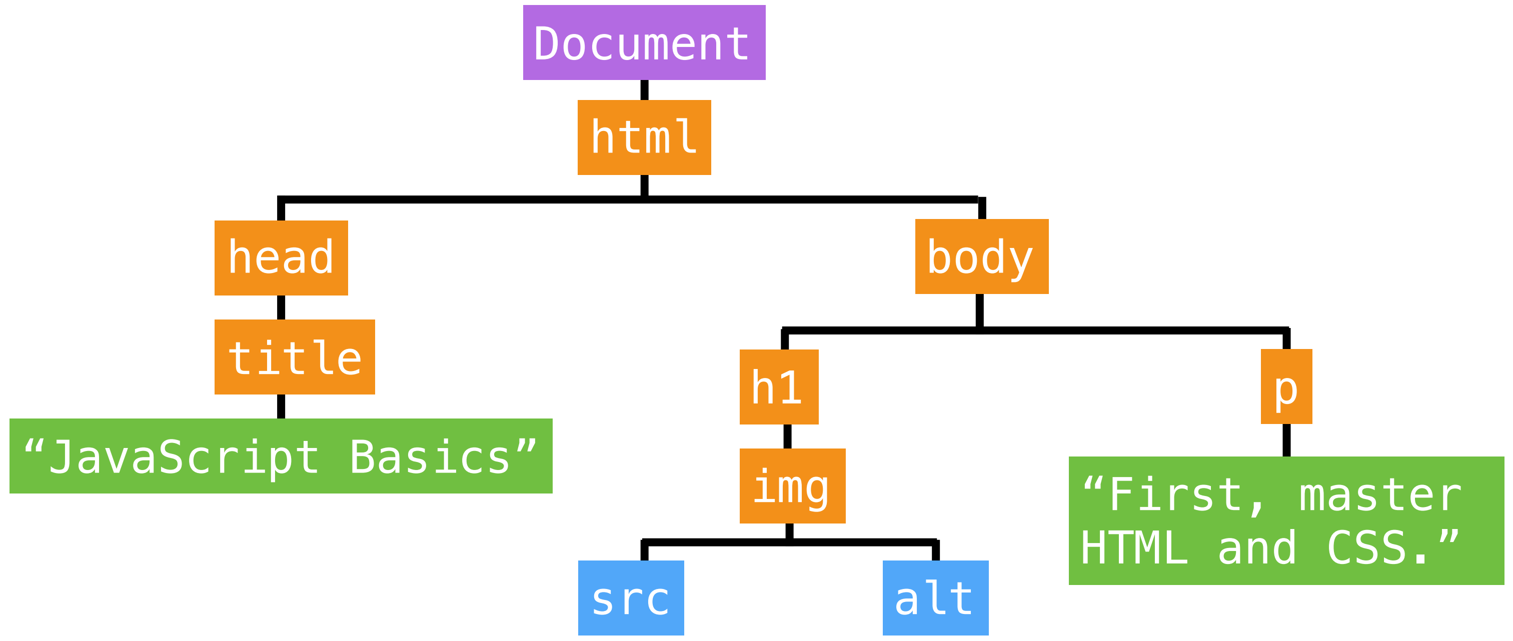
    <title>JavaScript Basics</title>
  </head>
  <body>
    <h1>
      <img src="logo.png" alt="JS Basics">
    </h1>
    <p>First, master HTML and CSS.</p>
  </body>
</html>
```

## DOM Tree



## The Document object

- Created by the browser
- Contains all web page elements as descendant objects
- Also includes its own properties and methods



## EXERCISE

EXERCISE

### KEY OBJECTIVE

- Identify differences between the DOM and HTML

### TYPE OF EXERCISE

- Pairs

### TIMING

*2 min* 1. How is the DOM different from a page’s HTML?

## REFERENCING A SCRIPT IN HTML

script element at the bottom of the body element

just before the closing </body> tag

```
<html>
  <head>
  </head>
  <body>
    <h1>JavaScript resources</h1>
    <script src="script.js"></script>
  </body>
</html>
```

## Selecting an element in the DOM

- `getElementById()`
- `getElementsByClassName()`
- `getElementsByTagName()`
- `querySelector()`
- `querySelectorAll()`

Let us select DOM elements using CSS selector syntax

## querySelector()

- Takes a single argument, a string containing CSS selector

**HTML**

```
<body>
  …
  <p id="main">Lorem ipsum</p>
  …
</body>
```

**JavaScript**

```
document.querySelector('#main');
```

## querySelector()

- Selects the **first** DOM element that matches the specified CSS selector

```
<body>
  …
  <ul>
    <li>Lorem ipsum</li>
    <li>Lorem ipsum</li>
    <li>Lorem ipsum</li>
  </ul>
…
</body>
```

**JavaScript**

```
document.querySelector(‘li’);
```

## querySelectorAll()

- Takes a single argument, a string containing CSS selector
- Selects all DOM elements that match this CSS selector
- Returns a NodeList, which is similar to an array

```
<body>
  …
  <ul>
    <li>Lorem ipsum</li>
    <li>Lorem ipsum</li>
    <li>Lorem ipsum</li>
  </ul>
…
</body>
```

**JavaScript**

```
document.querySelectorAll(‘li’);
```

## What can we do with a selected element?

- Get and set its text content with the `innerHTML` property
- Get and set its attribute values by referencing them directly (`id`, `src`, etc.)

## innerHTML

- Gets the existing content of an element, including any nested HTML tags
- Sets new content in an element

```
var item = document.querySelector(‘li’);

console.log(item.innerHTML) // Gets value: “Lorem ipsum”

item.innerHTML = ‘Apples’ // Sets value: ‘Apples’
```

## `className` property

- Gets/sets an element’s `class` attribute value
- CSS style sheet contains a style rule for each class
  - Appearance of element changes based on which class is applied
  - This is the best practice.

```
var item = document.querySelector(‘li’);

console.log(item.className) // Gets value: ‘default’

item.className = ‘selected’
// Sets value: ‘selected’
```

## EXERCISE

EXERCISE

**LOCATION**

▸ `starter-code > 1-dom-exercise`

**TIMING**

*5 min*

1. Open index.html in your editor, then scroll to the bottom.
2. Add a reference to the app.js file where indicated, then save your changes.
3. Open app.js in your editor, then follow the instructions.

## EXERCISE

EXERCISE

### LOCATION

- `starter-code > 2-dom-attributes-exercise`

### TIMING

| | |
|---|---|
| *5 min* | 1. Open app.js in your editor, then follow the instructions. |

## Adding content to the DOM

1. create a new element with `document.createElement()`

## Adding content to the DOM

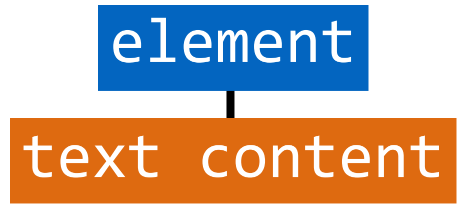
1. create a new element with `document.createElement()`
2. create new content for that element with `document.createTextNode()`

`element`

`text content`

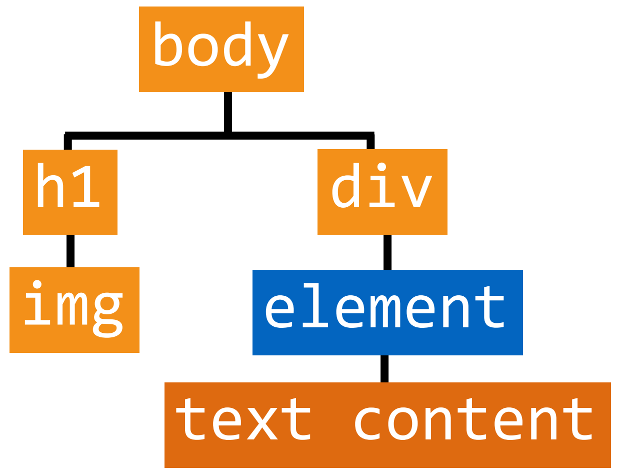
## Adding content to the DOM

1. create a new element with `document.createElement()`
2. create new content for that element with `document.createTextNode()`
3. attach the new text content to the new element with `appendChild()`



## Adding content to the DOM

1. create a new element with `document.createElement()`
2. create new content for that element with `document.createTextNode()`
3. attach the new text content to the new element with `appendChild()`
4. attach the new element to the DOM with `appendChild()`



## createElement()

- Creates a new element

```
document.createElement(‘li’); // creates an li element
```

- Created element isn’t attached to DOM
  - » assign variable when creating so you can reference later

```
let item1 = document.createElement(‘li’);
let item2 = document.createElement(‘li’);
```

## `createTextNode()`

- Creates text content that can be added as the child of another element
- Created text node isn't attached to DOM
  - » assign variable when creating so you can reference later

```
let text1 = document.createTextNode(‘banana’);
let text2 = document.createTextNode(‘apple’);
```

## `appendChild()`

- Attaches element or node as child of specified element
  - Attaching to an element that's not part of the DOM creates/expands a **document fragment**
- Syntax:
  `parent.appendChild(child);`

```
item1.appendChild(text1);   // adds text1 text to item1 li
item2.appendChild(text2);   // adds text2 text to item2 li
```

## `appendChild()` (continued)

- Attaches element or node as child of specified element
  - Attaching to a DOM element makes it part of the DOM
- Syntax:

  *parent*.appendChild(*child*);

```
let list = document.querySelector(‘ul’); // selects ul element
list.appendChild(item1);    // adds item1 li to list ul
list.appendChild(item2);    // adds item2 li to list ul
```

## EXERCISE

EXERCISE

### KEY OBJECTIVE

- Explain and use JavaScript methods for DOM manipulation.

### TYPE OF EXERCISE

- Groups of 3-4

### TIMING

*2 min*

1. Work together to create and complete a list of the four steps in DOM manipulation.
2. For each step in your list, add the method used.

## EXERCISE – ADD CONTENT TO A WEB PAGE USING JAVASCRIPT

EXERCISE

**LOCATION**

▸ `starter-code > 4-create-append—exercise`

**TIMING**

*15 min*

1. Open preview.png. Your task is to use DOM manipulation to build the sidebar shown in the image and add it to the blog.html web page.
2. Open app.js in your editor, then follow the instructions to create and the “About us” heading and the 2 paragraphs of text to the sidebar.
3. BONUS 1: Open preview-bonus.png, then write JavaScript code to add the image shown to the sidebar. (Filename and location in app.js.)
4. BONUS 2: Create and append the “Recent issues” heading and list.

## EVENTS

After we've selected elements, we can use DOM methods to create event listeners

## EVENT LISTENERS

selecting element

```
let button = document.querySelector('.submitBtn');
```

element reference

```
button.addEventListener('click', function() {
  // your code here
}, false);
```

## EVENT LISTENERS

```
let button = document.querySelector(‘.submitBtn’);
```

method to add event listener

```
button.addEventListener('click', function() {
  // your code here
}, false);
```

## EVENT LISTENERS

```
let button = document.querySelector(‘.submitBtn’);
```

type of event

```
button.addEventListener('click', function() {
  // your code here
}, false);
```

| MOUSE | KEYBOARD | FORM | DOCUMENT |
|---|---|---|---|
| click | keypress | submit | resize |
| dblclick | keydown | change | scroll |
| mouseenter | keyup | focus | |
| mouseleave | | blur | |

```
button.addEventListener('eventgoeshere', function() {
  // your code here
}, false);
```

## EVENT LISTENERS

```
let button = document.querySelector(‘.submitBtn’);
```

```
button.addEventListener('click', function() {
  // your code here
}, false);
```

function to run when event is triggered

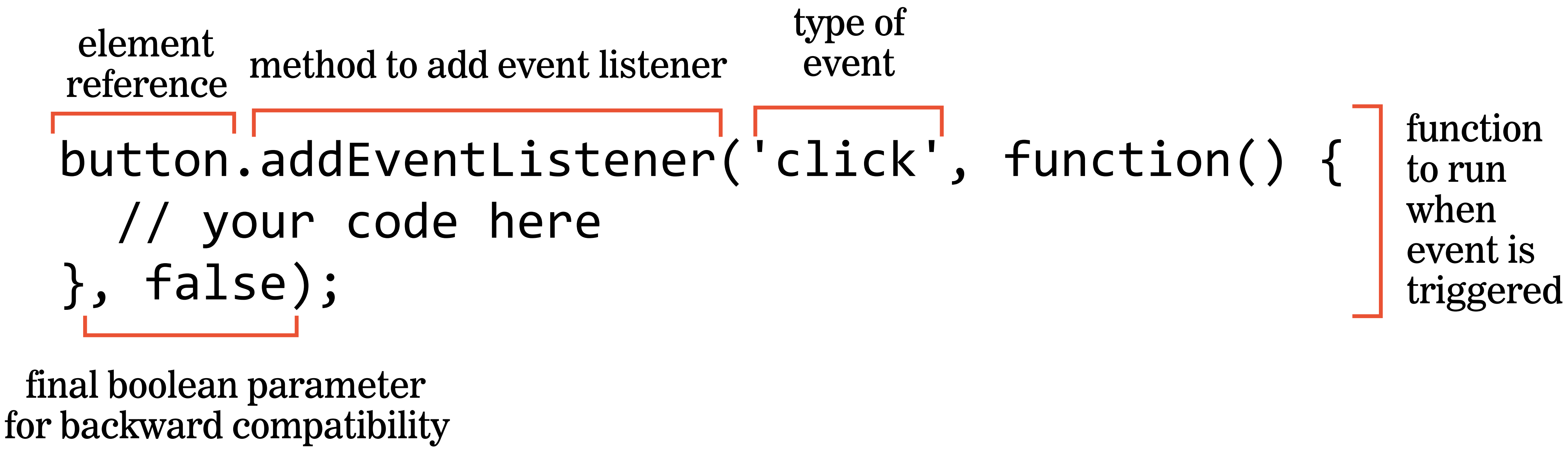
## EVENT LISTENERS

```
let button = document.querySelector(‘.submitBtn’);
```

```
button.addEventListener('click', function() {
  // your code here
}, false);
```

final boolean parameter
for backward compatibility

## EVENT LISTENERS



```
button.addEventListener('click', function() {
  // your code here
}, false);
```

element reference
method to add event listener
type of event
function to run when event is triggered
final boolean parameter for backward compatibility

## ACTIVITY

EXERCISE

### KEY OBJECTIVE

- Explain and use JavaScript methods for DOM manipulation

### TYPE OF EXERCISE

- Individual/Partner

### AS A CLASS

*10 min*

Exercise is in `6-events-exercise` folder

1. Add event listeners to the 3 buttons at the top of the page. Clicking each button should hide the block below it with the corresponding color.
2. Use cheat sheet/slides as a guide for syntax
3. BONUS: Add an event listener for the "Show all blocks" button that removes the hidden class from all the colored block elements.

## `preventDefault()`

- Prevents element from executing default behavior in response to an event

## Referencing an event

- An object containing information about the triggering event is passed to a function called in response to an event
- Specify a parameter to be able to reference this event in your code
  - By convention, we use `event`, `evt`, or `e`

```
submitButton.onclick = function(event) {
  event.preventDefault();
  ...
}
```

## EXERCISE

EXERCISE

### LOCATION

▸ `starter-code > 7-js-dom–exercise`

### TIMING

*until 9:20*

1. Open index.html in your browser.
2. Open main.js in your editor, then follow the instructions to make the submit button functional and use DOM manipulation to add items to the list.
3. BONUS: Add functionality that adds a message to the page that alerts the user when they click Submit without typing anything. (Use DOM manipulation, not the `alert` method.)

# Exit Tickets!

(Class #7)

## LEARNING OBJECTIVES - REVIEW

- Identify differences between the DOM and HTML.
- Explain and use JavaScript methods for DOM manipulation.
- Create DOM event handlers to respond to user actions

## NEXT CLASS PREVIEW

### Intro to jQuery

- Manipulate the DOM by using jQuery selectors and functions.
- Register and trigger event handlers for jQuery events.
- Use chaining to place methods on selectors.

## Q&A