JS and HTML

The DOM, events, selectors, timers and callbacks

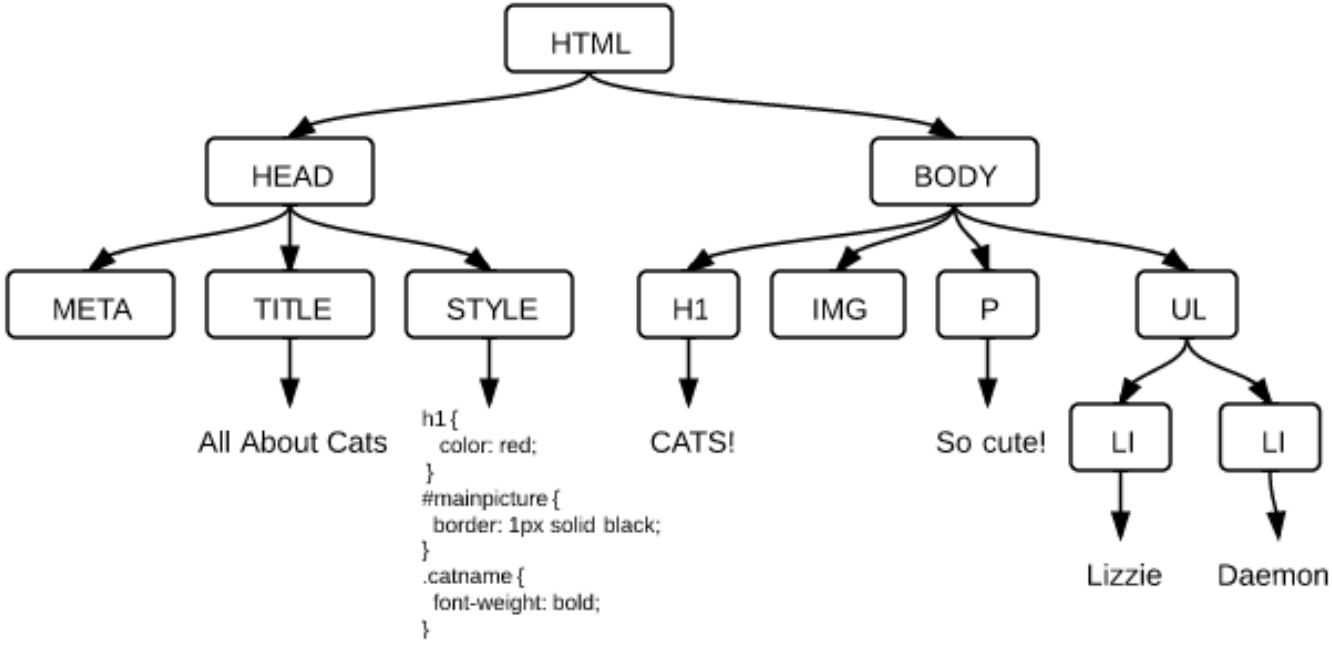
Our Goals

- Review
- Introduce the:
  - DOM
  - Selectors
  - Callbacks
  - Events
  - Animations

What is the DOM?

- It stands for the ***Document Object Model***
- It is the way that Javascript interacts with HTML and CSS
- It's basically a javascript object, but is mostly referred to as a ***tree***
- The browser always has it
- It comes from HTML
- It is your HTML and CSS when it is received and parsed by the browser. It can be different though!

What is the DOM?



Key things about DOM

- Each point of data is called a ***node***
- Each ***node*** can have ***parents***, ***children*** and ***siblings***
- The DOM is accessed through a global variable called:
  - `document`
- We can call methods and access properties - just like an object

Identify away!

```
<!DOCTYPE html>
<html>
<head>
    <title>Some website</title>
</head>
<body>
    <div class="container">
        <h1>Some heading</h1>
        <p>Some text</p>
        <a href="http://www.google.com">Some <span>link</span></a>
    </div>

    <ul>
        <li>A link</li>
        <li>Another link</li>
        <li>Another link</li>
    </ul>
</body>
</html>
```

DOM Access

The document object gives us ways of accessing the DOM, finding elements, changing styles, etc.

The general strategy for DOM manipulation:

- Find the DOM node by using an access method and store it in a variable
- Manipulate the DOM node by changing its attributes, style, inner HTML, or by appending nodes to it

DOM Access by ID

`document.getElementById( id );`

If we had this in our HTML:

```
<img src="http://fillmurray.com/300/300" id="mainHeading">

<p id="randomParagraph">
    Gibberish goes here
</p>
```

We could access it like this

```
var img = document.getElementById( "mainImage" );

var p = document.getElementById( "randomParagraph" );
```

DOM Access by Tagname

`document.getElementsByTagName( tagName );`

If we had this in our HTML:

```
<ul>
    <li>A list item</li>
    <li>Another list item</li>
    <li>Another list item</li>
</ul>
```

We could access it like this

```
var listItems = document.getElementsByTagName( "li" );

for (var i = 0; i < listItems.length; i++) {
    var listItem = listItems[i];
}
```

DOM Access by Class name

`document.getElementsByClassName( tagName );`

If we had this in our HTML:

```
<ul>
    <li>A list item</li>
    <li class="item">Another list item</li>
    <li class="item">Another list item</li>
</ul>
```

We could access it like this

```
var listItems = document.getElementsByClassName("item");

for (var i = 0; i < listItems.length; i++) {
    var listItem = listItems[i];
}
```

HTML5 DOM Access

`document.querySelector( cssSelector );`

`document.querySelectorAll( cssSelector );`

```
<ul>
    <li>A list item</li>
    <li class="item">Another list item</li>
    <li class="item">Another list item</li>
</ul>
```

We could access it like this

```
var firstItem = document.querySelector("ul li");
// Only first item

var allItems = document.querySelectorAll("ul li.item");
// All list items with the class item
```

DOM Access - Array vs. Item

```
//////////////////
// Single item //
//////////////////

document.getElementById( "id" );
document.querySelector( "cssSelector" );
// First match

//////////////////////
// Array of items //
//////////////////////

document.getElementsByClassName( "class" );
document.querySelectorAll( "cssSelector" );
// All matches
```

Have a crack at these exercises

DOM Nodes: Attributes

You can access and change attributes!

If we had this in our HTML:

```
<img src="http://fillmurray.com/g/200/300" id="bill">
<a href="https://www.youtube.com/watch?v=jqGnfxa8-pg" id="satantango">
    Satantango
</a>
```

We could access it like this

```
var billImage = document.getElementById("bill");
billImage.src = "http://www.placecage.com/c/200/300";

var satantangoLink = document.getElementById("satantango");
satantangoLink.href = "https://www.youtube.com/watch?v=B7u704uMCmo";
satantango.className = "bestMovie";
```

DOM Nodes: Styles

You can access and change attributes!

```
// Changing Styles

var body = document.getElementsByTagName("body")[0];

body.style.background = "hotpink";
body.style.fontFamily = "Comic Sans";
body.style.paddingTop = "10px";
```

- CSS properties that normally have a hyphen in it, you must camelCase it
- Number properties must have a unit - they won't default to pixels

DOM Nodes: HTML

Each node, has an innerHTML property with the HTML of all of its children

```
// Accessing HTML

var body = document.getElementsByTagName("body")[0];

var bodyContent = body.innerHTML;
console.log( bodyContent );

// Setting HTML

body.innerHTML = "<h1>Bye bye, content!</h1>";
body.innerHTML += "<p>Oh well</p>";
```

Have a crack at these exercises

Creating DOM Nodes

We can make our own HTML elements as well!

```
// Create elements
var newParagraph = document.createElement('p');
var paragraphText = document.createTextNode('New Paragraph!');

// Style an element (before it is on the page)
newParagraph.style.fontFamily = "Comic Sans";
newParagraph.style.color = "hotpink";

// Put the element on the page
newParagraph.appendChild(paragraphText);
document.body.appendChild(newParagraph);
```

Have a crack at these exercises

Some terminology

- **Event:** something that happens
- **Callback:** a function that executes after the event has happened
- **Event listener:** a method that binds an event to a callback

A basic example

```
var myButton = document.querySelector('button#testButton');

myButton.addEventListener('click', function() {
  console.log('button clicked!');
});
```

The basic process:

- Find the element
- Add the event listener and pass in a function to call

That was an anonymous function

```
var myButton = document.querySelector('button#testButton');

myButton.addEventListener('click', function() {
  console.log('button clicked!');
});
```

You can't ever remove that event handler!

Referenced Events

```
var myButton = document.querySelector('button#testButton');

var myCallback = function () {
  console.log('button clicked!');
}

myButton.addEventListener('click', myCallback);

myButton.removeEventListener('click', myCallback);
```

Much better!

Events and *Event*

When you add an event listener, the callback that you pass in will get given an object.

- That stores all sorts of details about the event!

```
var myButton = document.querySelector('button#testButton');

var myCallback = function (event) {
  console.log( event );
}

myButton.addEventListener('click', myCallback);

myButton.removeEventListener('click', myCallback);
```

Timers

```
// ONCE OFF //
// window.setTimeout(someCallback, delayInMilliseconds);

window.setTimeout(function () {
    console.log("This function won't run for a second");
}, 1000);

// EVERY SO OFTEN //
// window.setInterval(someCallback, delayInMilliseconds);

window.setInterval(function () {
    console.log("This function will run every second");
}, 1000);
```

Animations in JS - Attributes

```
var bill = document.querySelector("img");

window.setInterval(function () {
  bill.setAttribute("width", bill.width += 10);
}, 100);
```

Animations in JS - Style

```
// Find the element, set the starting point
var bill = document.querySelector("img");
bill.style.opacity = 1.0;

var fadeAway = function () {
    bill.style.opacity = bill.style.opacity - 0.01;
};

window.setInterval(fadeAway, 10);
```

Animations in JS - Style

```
var bill = document.querySelector('img');

bill.style.position = 'absolute';
bill.style.top = '0px';

var watchBillFall = function() {
  var oldTop = parseInt(bill.style.top);
  var newTop = oldTop + 10;
  bill.style.top = newTop + 'px';
};

window.setInterval(watchBillFall, 1000);
```

Starting and Stopping

```
window.clearTimeout( timerID );
window.clearInterval( timerID );
```

```
var bill = document.querySelector("img");
bill.style.opacity = 1.0;

var fadeAway = function () {
    bill.style.opacity = bill.style.opacity - 0.01;
    if (bill.style.opacity < 0.5) {
        window.clearInterval( fadeTimer );
    }
};

var fadeTimer = window.setInterval(fadeAway, 10);
```

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Your homework

- Previous examples