Introduction to the Document Object Model

You're About to learn

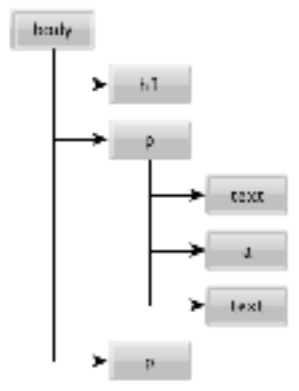
- **What is the DOM?**
- **Why should we care?**
- **DOM Manipulation**
    - Searching the DOM
    - How to traverse the DOM
    - How to change the DOM

What is the DOM?

The Document Object Model is what allows web pages to render, respond to user events and change

HTML vs DOM

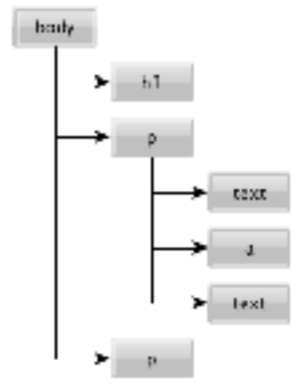
```
<body>
  <h1>Hello</h1>
  <p>
    Check out my
    <a href="/page">Page!</a>
    It's the best page out there
  </p>

  <p>Come back soon!</p>
</body>
```



http://software.hixie.ch/utilities/js/live-dom-viewer/?%3C!DOCTYPE%20html%3E%0A%3Chtml%3E%0A%09%3Chead%3E%0A%09%20%20%20%20%3Ctitle%3EMy%20first%20web%20page%3C%2Ftitle%3E%0A%09%3C%2Fhead%3E%0A%09%3Cbody%3E%0A%09%20%20%20%20%3Ch1%3EHello%20world!%3C%2Fh1%3E%0A%09%20%20%20%20%3Cp%3E%3Cb%3EI%27m%20very%20excited%3C%2Fb%3E%20to%20be%20exploring%20the%20Document%20Object%20Model.%20Here%27s%20the%20%3Ca%20href%3D%22wikipedia.org%2FDOM%22%3EWikipedia%3C%2Fa%3E%20page%20on%20the%20topic.%3C%2Fp%3E%0A%09%3C%2Fbody%3E%0A%3C%2Fhtml%3E

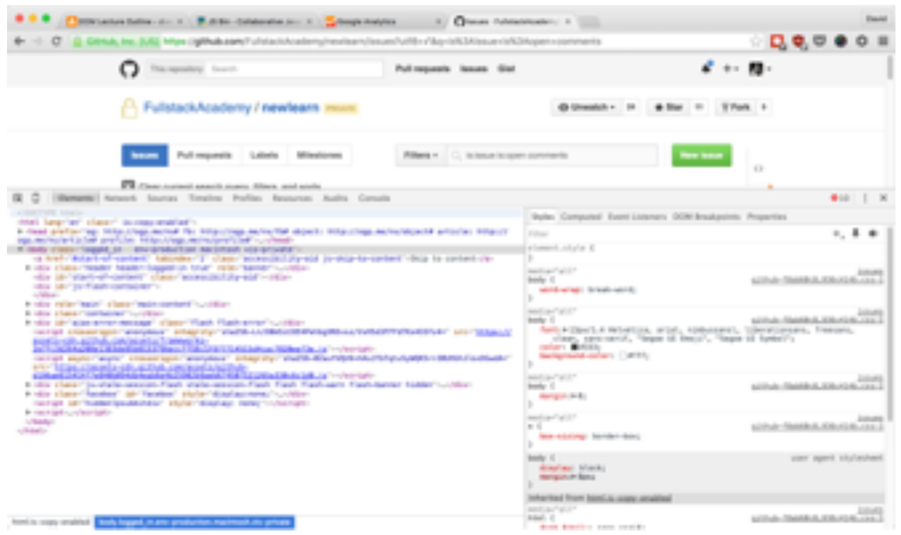
The DOM is a Tree

- Trees are a data structure from computer science
- The main idea here: There is a Node that branches into other Nodes (its children Nodes)
  - Each Node can have 0 to many children Nodes
  - Nodes can have 0 or 1 parent
  - Nodes can have 0 to many Sibling Nodes



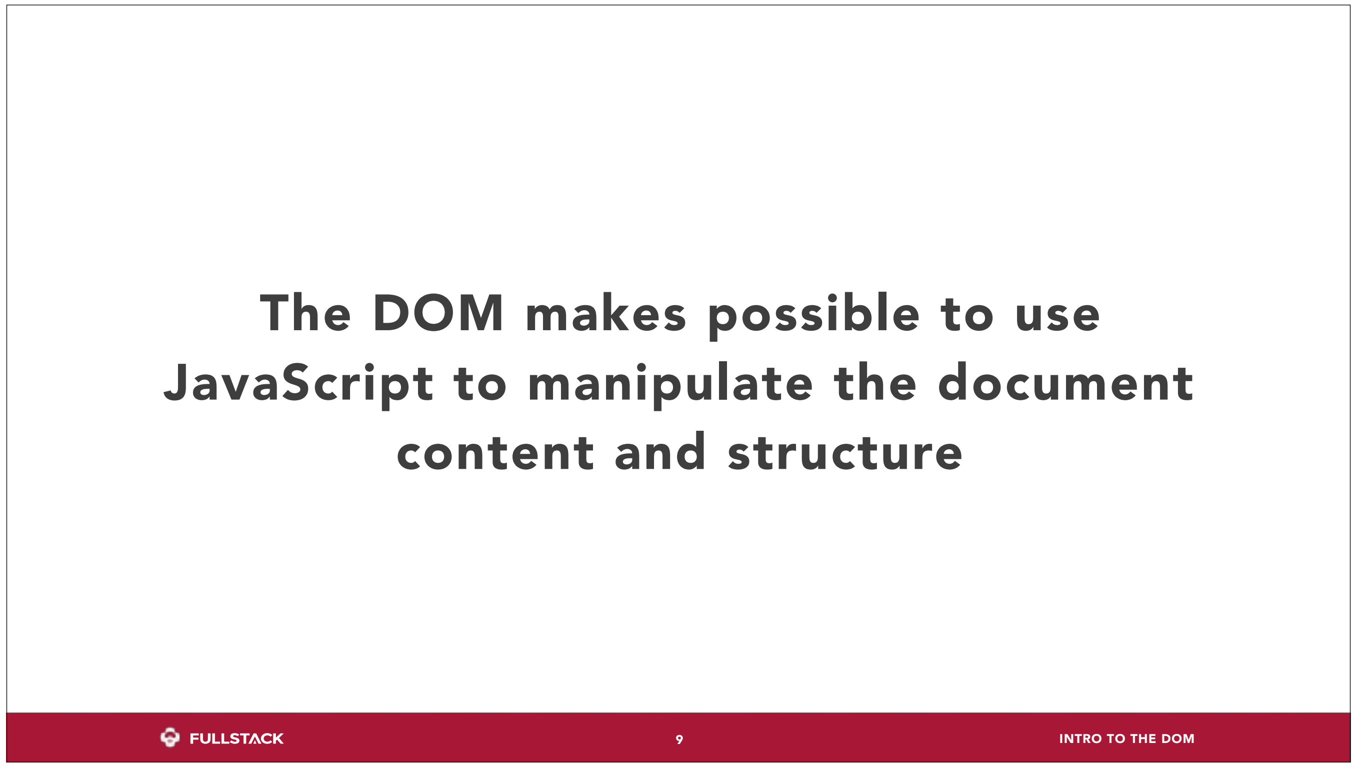
- whats the parent, whats the child, what’s the sibling.
- similar to folder structure (show sublime text)

Chrome Developer Tools



source = serialized stuff
developer tools = shows the actual dom representation

Why care?



The DOM makes possible to use JavaScript to manipulate the document content and structure

In other words, it allows us to write code that dynamically changes what the user is seeing.

Nodes have lots of Attributes

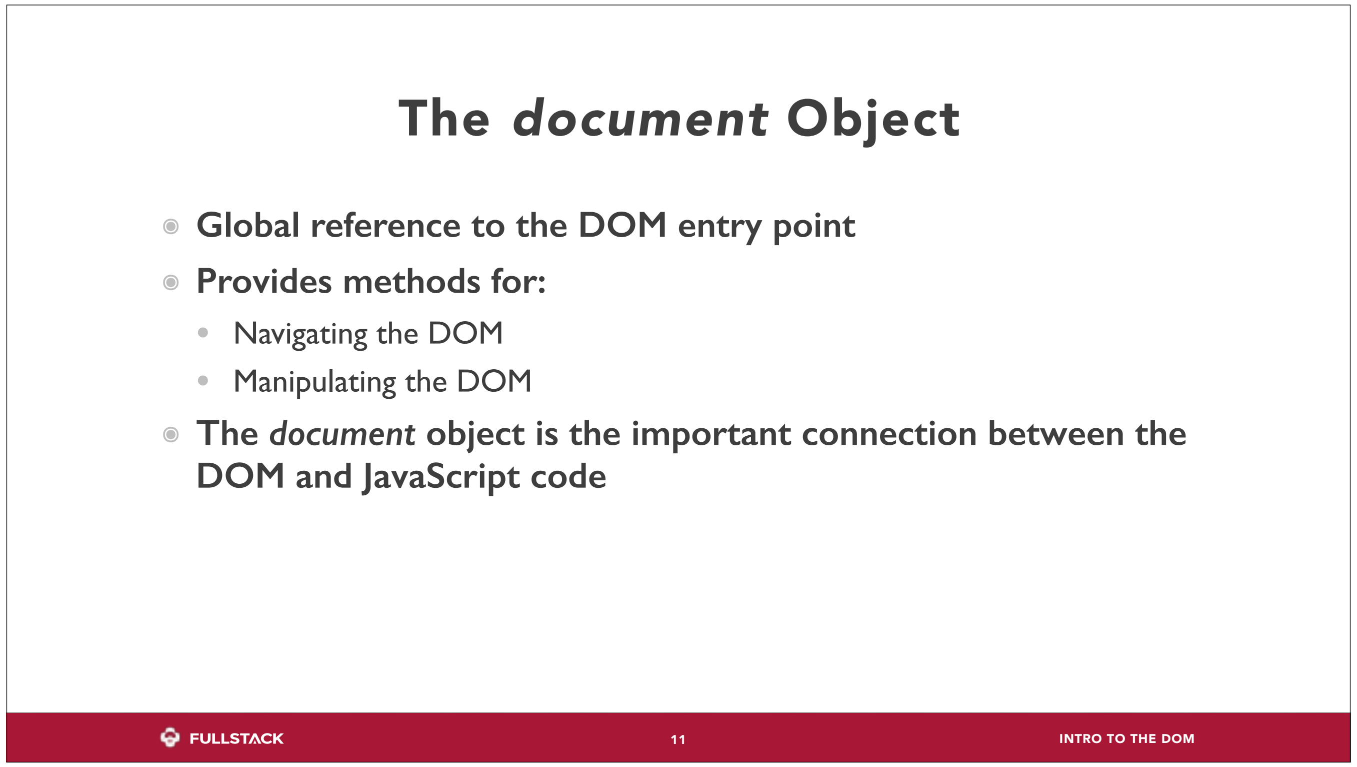
- Nodes are JavaScript Objects
- Nodes have Attributes that are JavaScript properties
- Attributes define how the Node looks and responds to User activity

ONE NODE

Hundreds of properties!

Node are just JavaScript Objects - they're bags of attributes.
These objects contain 100s of attributes that let you change the node in two main ways:
- how it looks and is drawn by the browser
- how it responds to user input

Now we'll get into how to use JS to manipulate these Nodes.



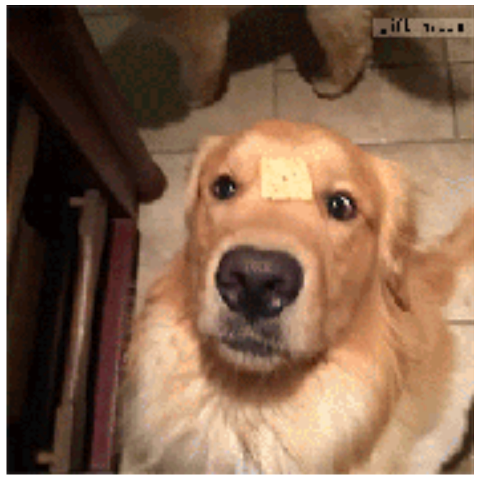
The *document* Object

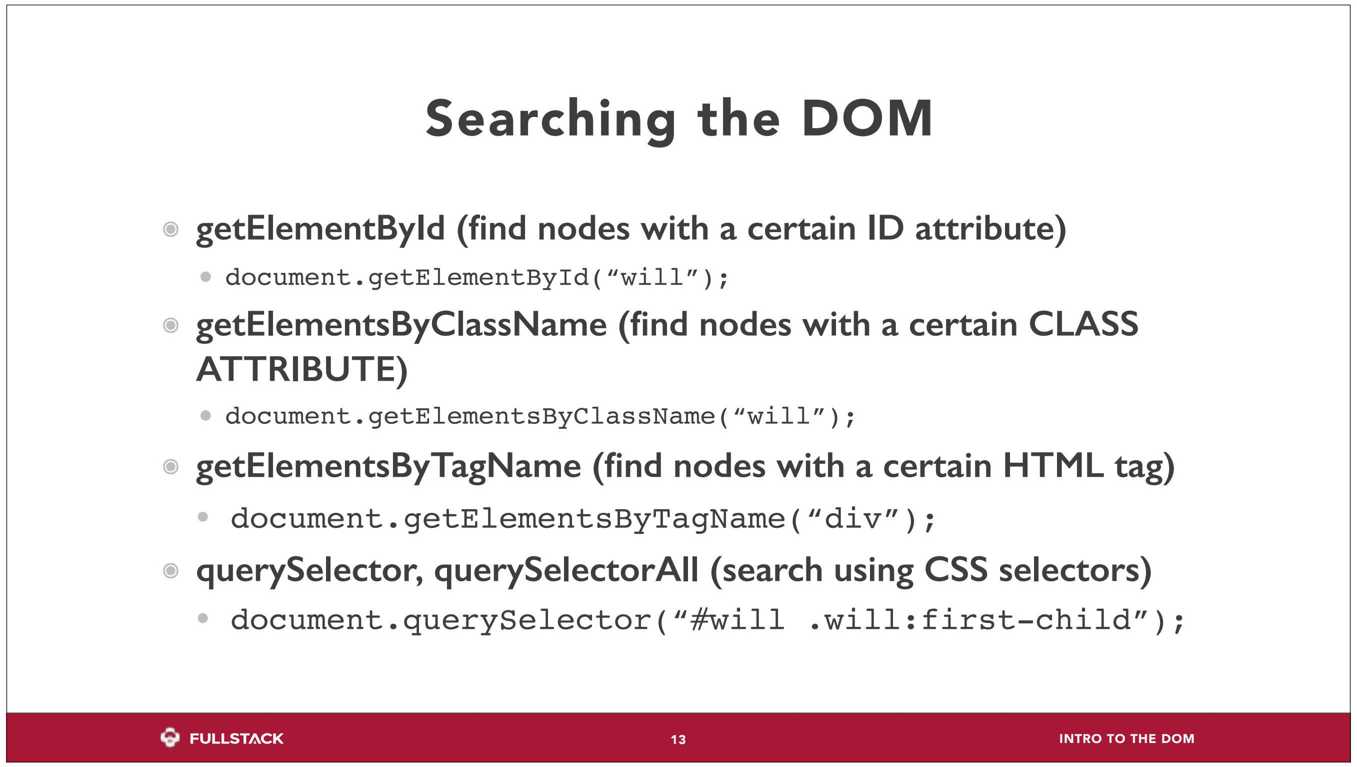
- **Global reference to the DOM entry point**
- **Provides methods for:**
  - Navigating the DOM
  - Manipulating the DOM
- **The *document* object is the important connection between the DOM and JavaScript code**

Without the document object, we could write JavaScript but we wouldn't be able to manipulate the DOM. The browser gives us access to the object so that we can do these things and that's the power behind HTML and JS.

CSS of course is involved as well.

Searching the DOM





Searching the DOM

- getElementById (find nodes with a certain ID attribute)
  - `document.getElementById(“will”);`
- getElementsByClassName (find nodes with a certain CLASS ATTRIBUTE)
  - `document.getElementsByClassName(“will”);`
- getElementsByTagName (find nodes with a certain HTML tag)
  - `document.getElementsByTagName(“div”);`
- querySelector, querySelectorAll (search using CSS selectors)
  - `document.querySelector(“#will .will:first-child”);`

One thing to be careful about is that getElementById returns the first Element it finds. That's why you don't want to have multiple IDs on a page.

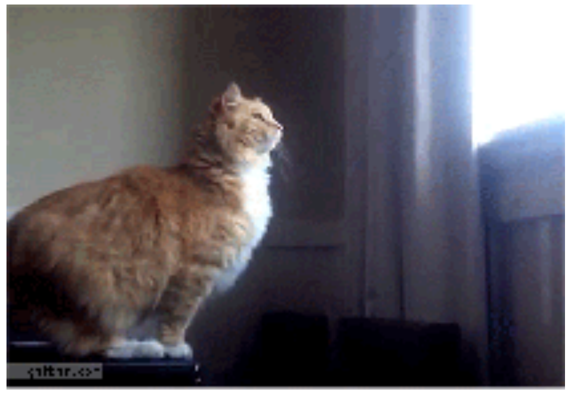
getElements... returns an HTMLCollection (array-like object) of Elements, even if there is only one element with that class or tag. Then you can use your JavaScript to manipulate all of the elements.

querySelectorAll - returns a NodeList

Array-Like Objects? Bleh!

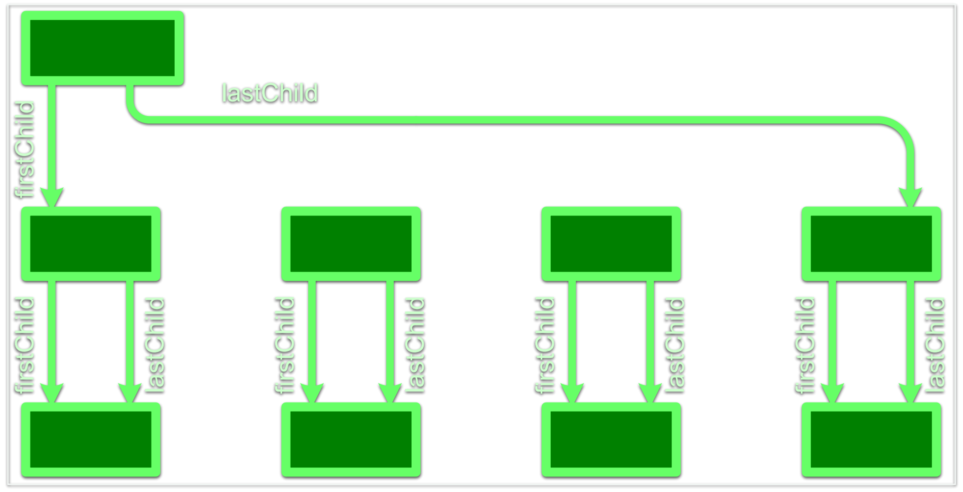
- `const realArr = [].prototype.slice.call(arrayLike)`
- `const realArr = Array.from(arrayLike)`
- `const realArr = [...arrayLike]`

Traversing the DOM

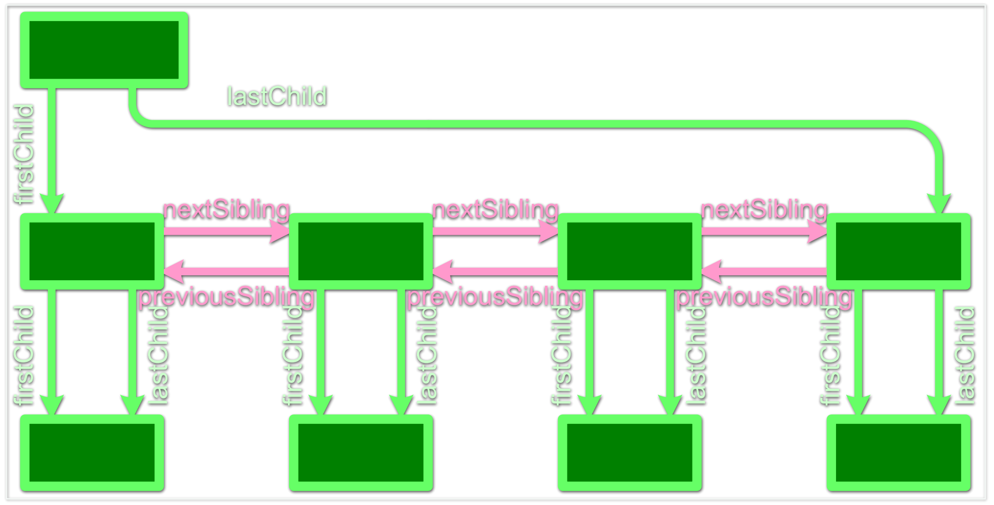


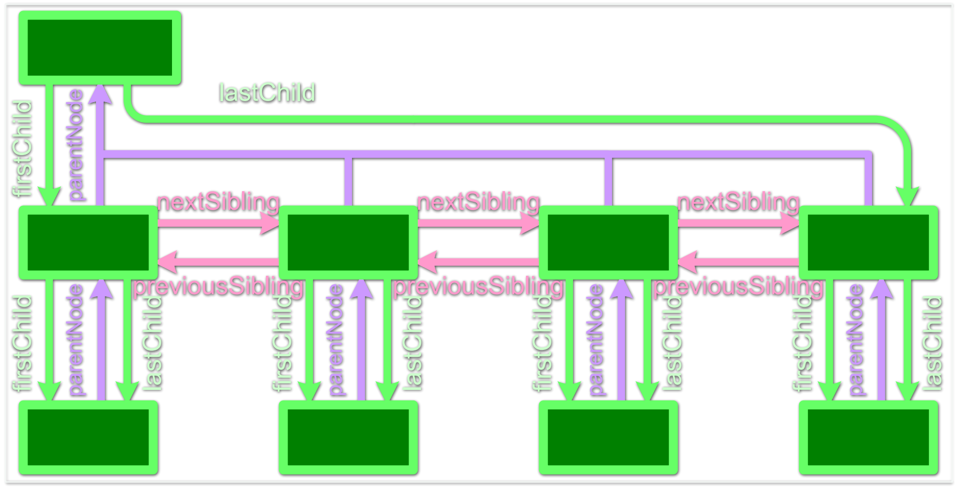
Traversing the DOM

- **Tree Structures are easy to navigate:**
  - At any point in the DOM you are at a Node
  - No matter where you go, you're still at a Node
    - Child
    - Parent
    - Sibling
  - All Nodes share similar DOM navigation methods



where have we seen firstChild and lastChild? (answer = css)

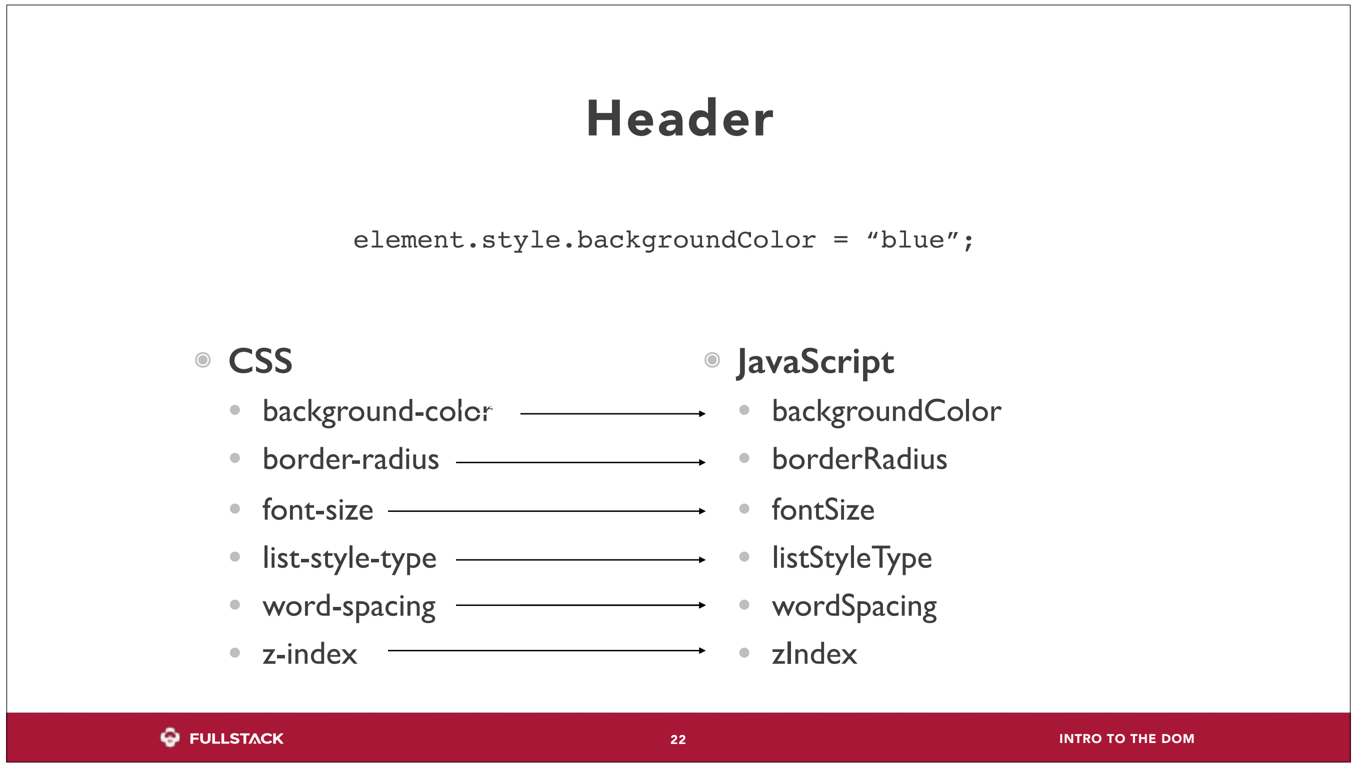

lastChild
firstChild
nextSibling
nextSibling
nextSibling
previousSibling
previousSibling
previousSibling
firstChild
lastChild
firstChild
lastChild
firstChild
lastChild
firstChild
lastChild


lastChild
firstChild
parentNode
nextSibling
nextSibling
nextSibling
previousSibling
previousSibling
previousSibling
firstChild
parentNode
lastChild
firstChild
parentNode
lastChild
firstChild
parentNode
lastChild
firstChild
parentNode
lastChild

Traversing the DOM

- Access children
  - `element.children, element.lastChild, element.firstChild`
- Access siblings
  - `element.nextElementSibling, element.previousElementSibling`
- Access parent
  - `element.parentElement`

Changing the DOM


Header

```
element.style.backgroundColor = “blue”;
```

CSS	JavaScript
background-color	backgroundColor
border-radius	borderRadius
font-size	fontSize
list-style-type	listStyleType
word-spacing	wordSpacing
z-index	zIndex

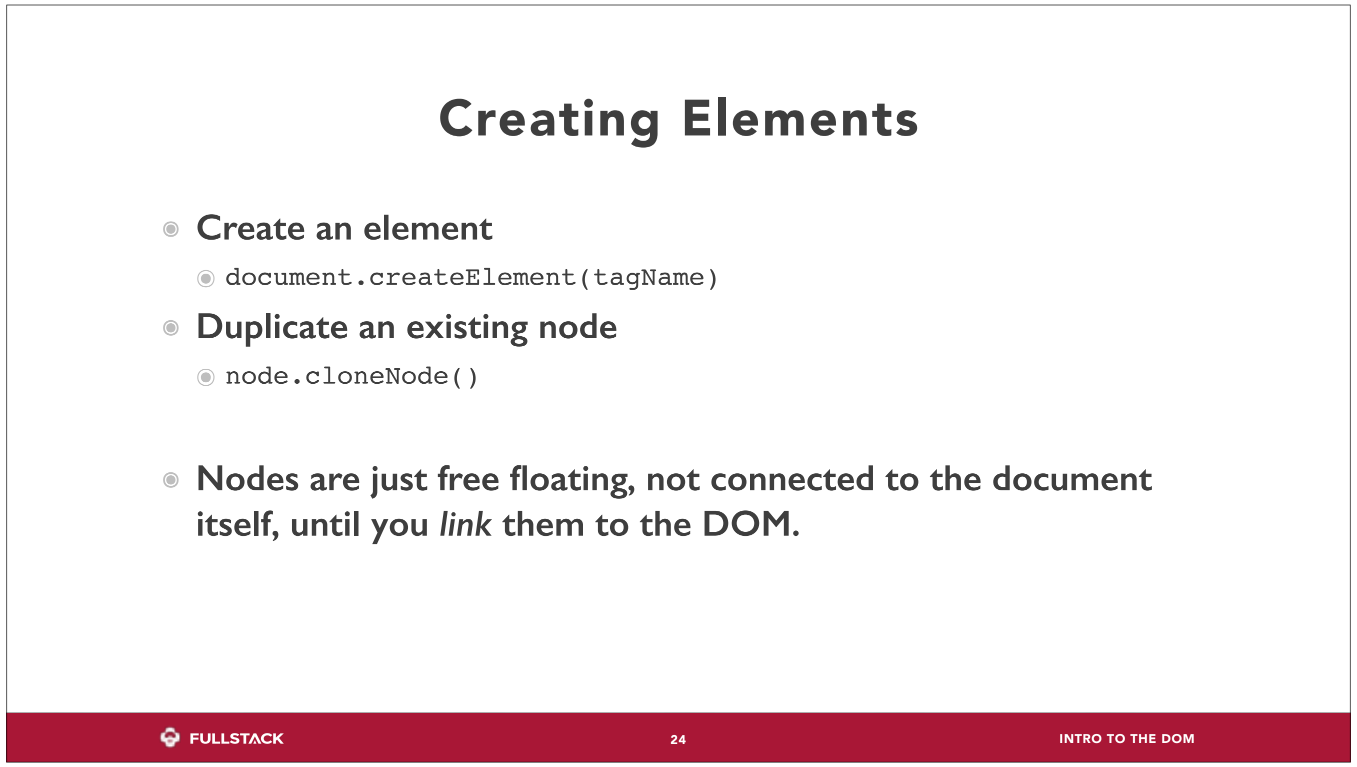
We can change the built in attributes either via CSS or JavaScript

Notice that one uses camelCase and the other uses dashed

Changing CSS Classes

- *className* attribute is a string of all of a Node's classes
- *classList* is HTML5 way to modify which classes are on a Node

```
document.getElementById("MyElement").classList.add('class');

document.getElementById("MyElement").classList.remove('class');

if ( document.getElementById("MyElement").classList.contains('class') )

document.getElementById("MyElement").classList.toggle('class');
```



Creating Elements

- Create an element
  - `document.createElement(tagName)`
- Duplicate an existing node
  - `node.cloneNode()`

- Nodes are just free floating, not connected to the document itself, until you *link* them to the DOM.

Examples:
- create a div
- first create it, then add it.

Adding elements to the DOM

- Insert newNode at end of current node
  - `node.appendChild(newNode);`
- Insert newNode at end of current node
  - `node.prependChild(newNode);`
- Insert newNode before a certain childNode
  - `node.insertBefore(newNode, sibling);`

Removing Elements

- **Removes the oldNode child.**
  - `node.removeChild(oldNode);`

- **Quick hack:**
  - oldNode.parentNode.removeChild(oldNode);

WORKSHOP