Introduction to the Document Object Model

You're About to learn

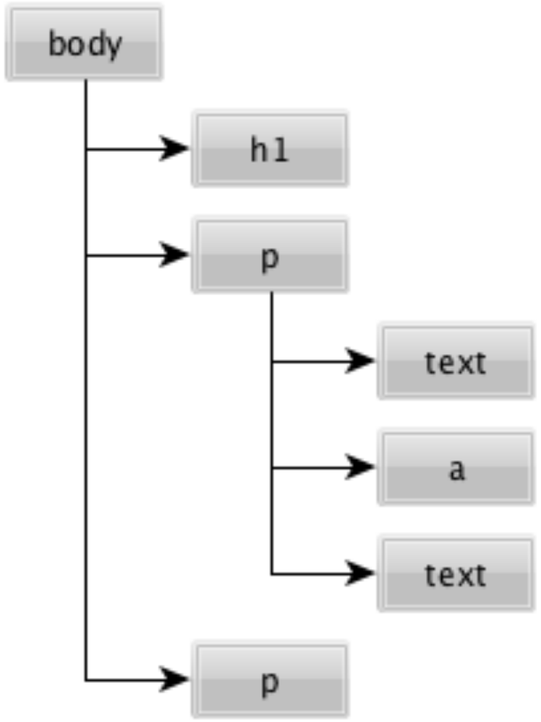
- **What is the DOM?**
- **Why should we care?**
- **DOM Manipulation**
  - Searching the DOM
  - How to traverse the DOM
  - How to change the DOM

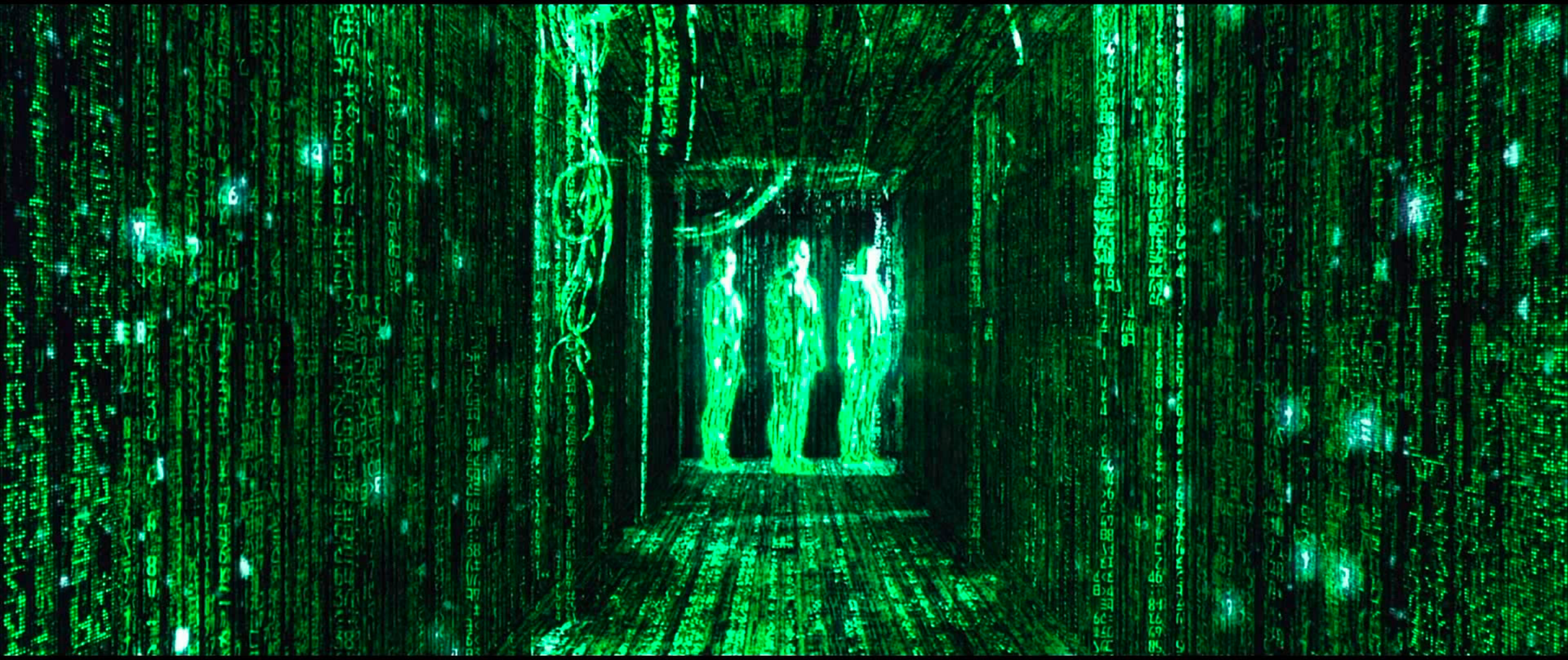
What is the DOM?

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

HTML vs DOM

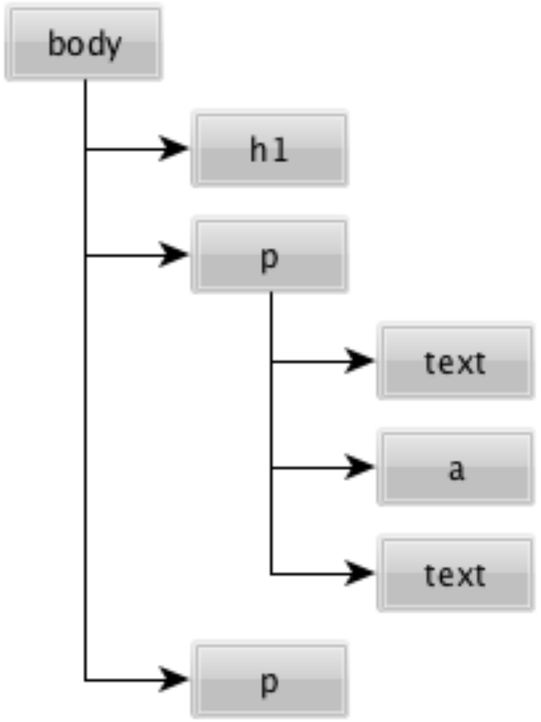
```
<body>

  <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>
```



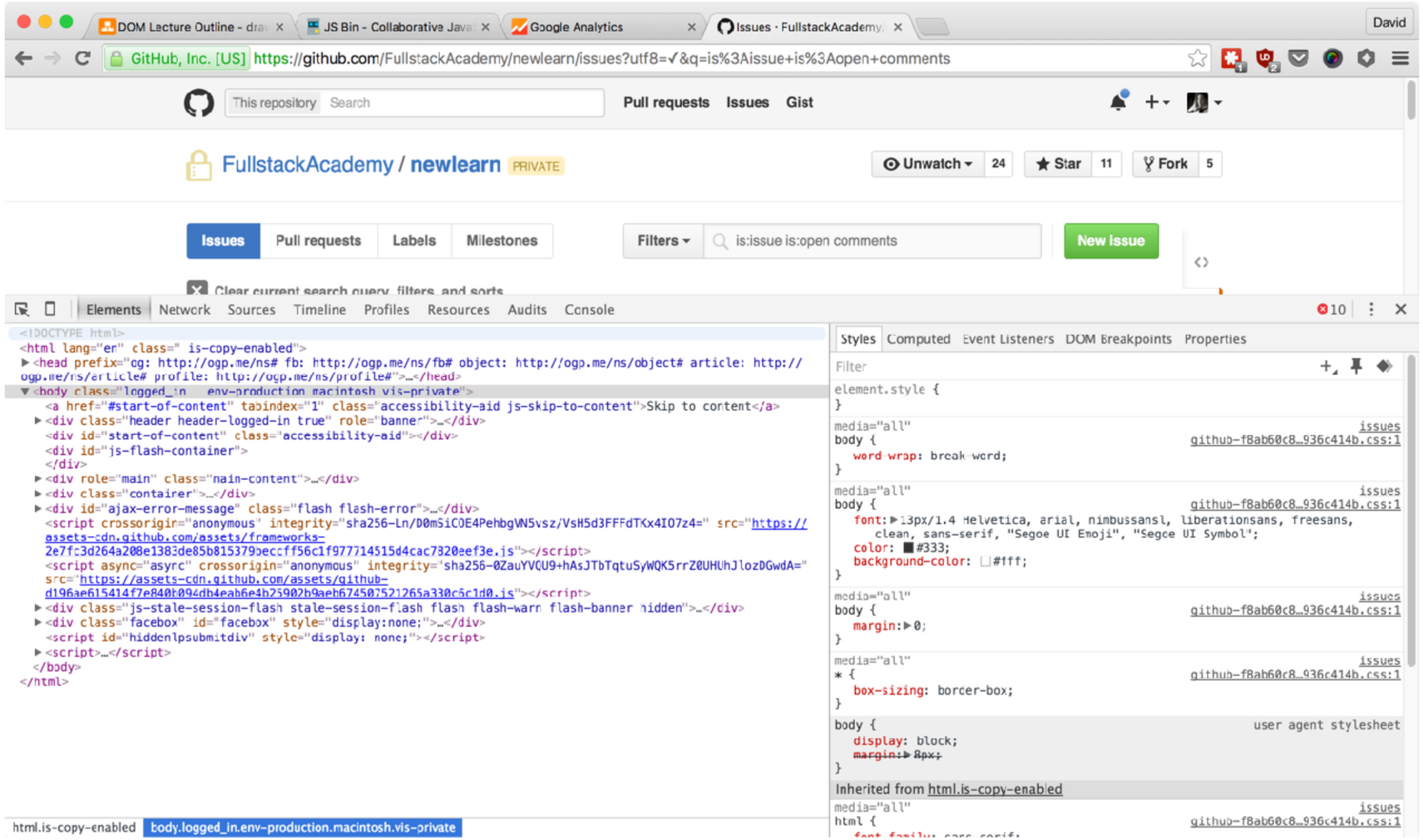


The DOM is a Tree

- 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



Developer Tools

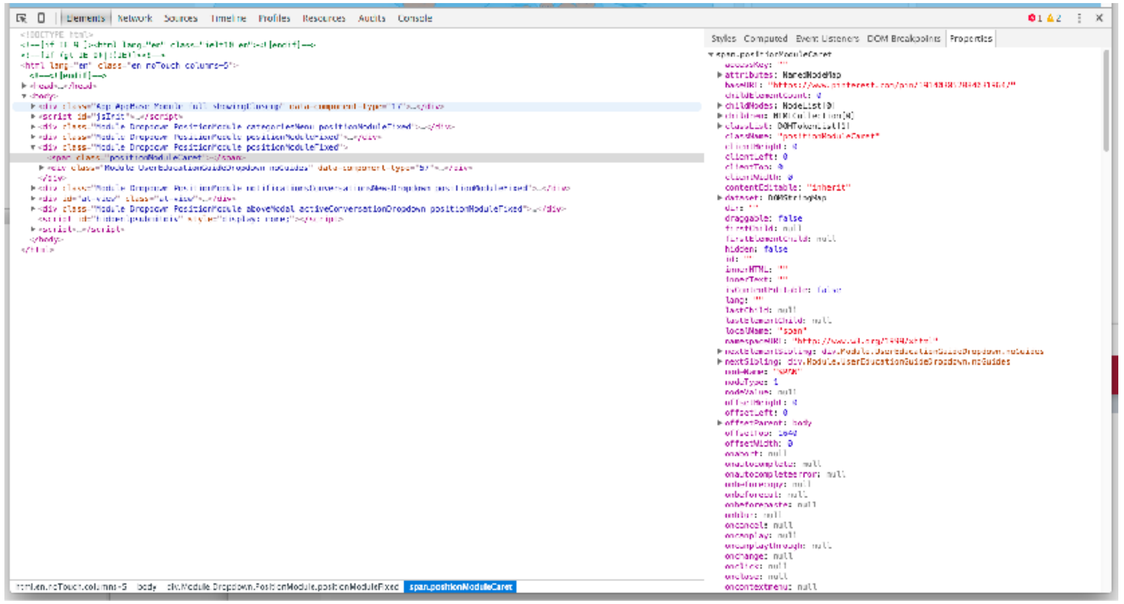


Why care?

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

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!

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

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");`

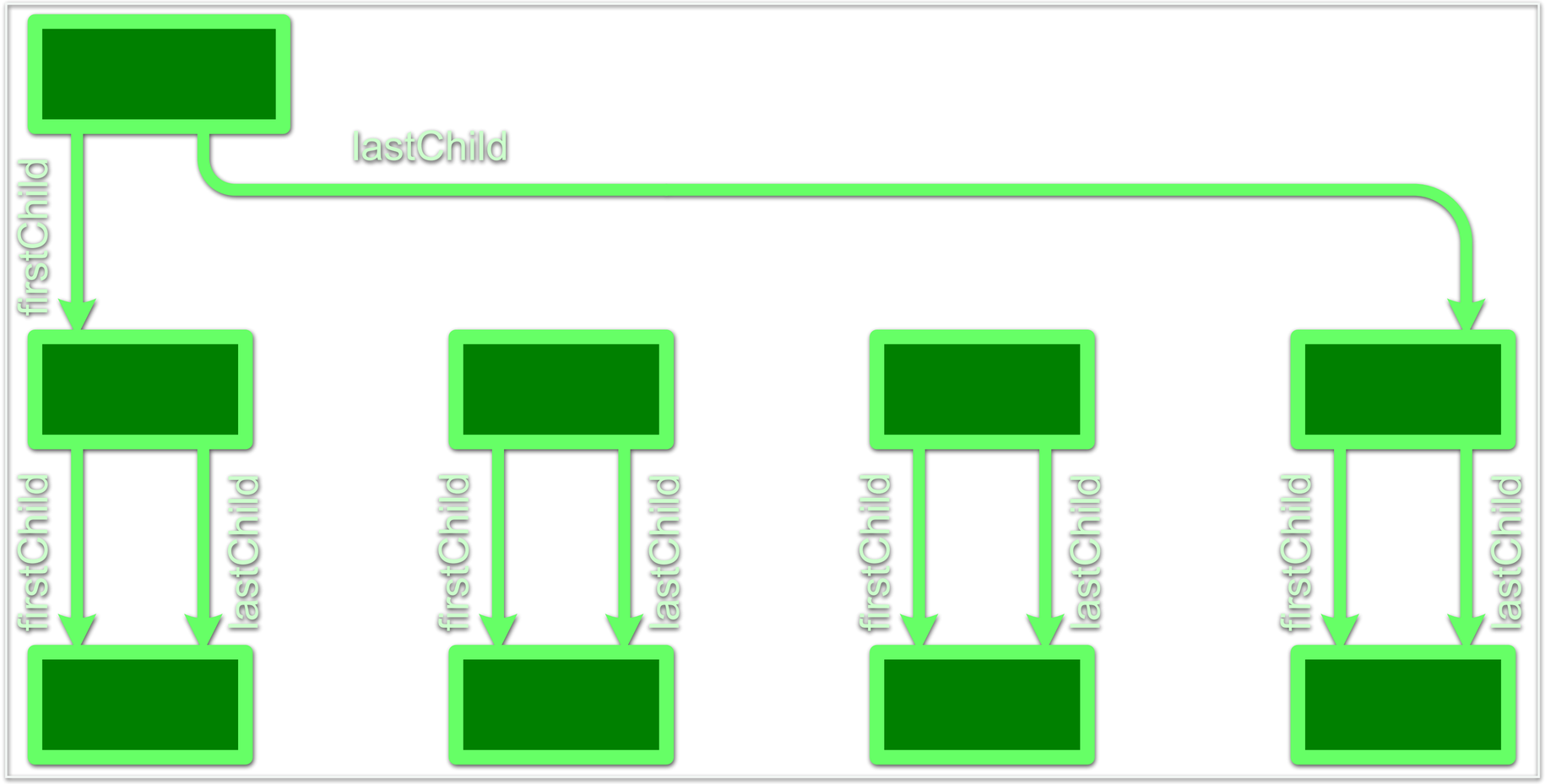
Array-Like Objects? Bleh!

- `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


lastChild
firstChild
firstChild
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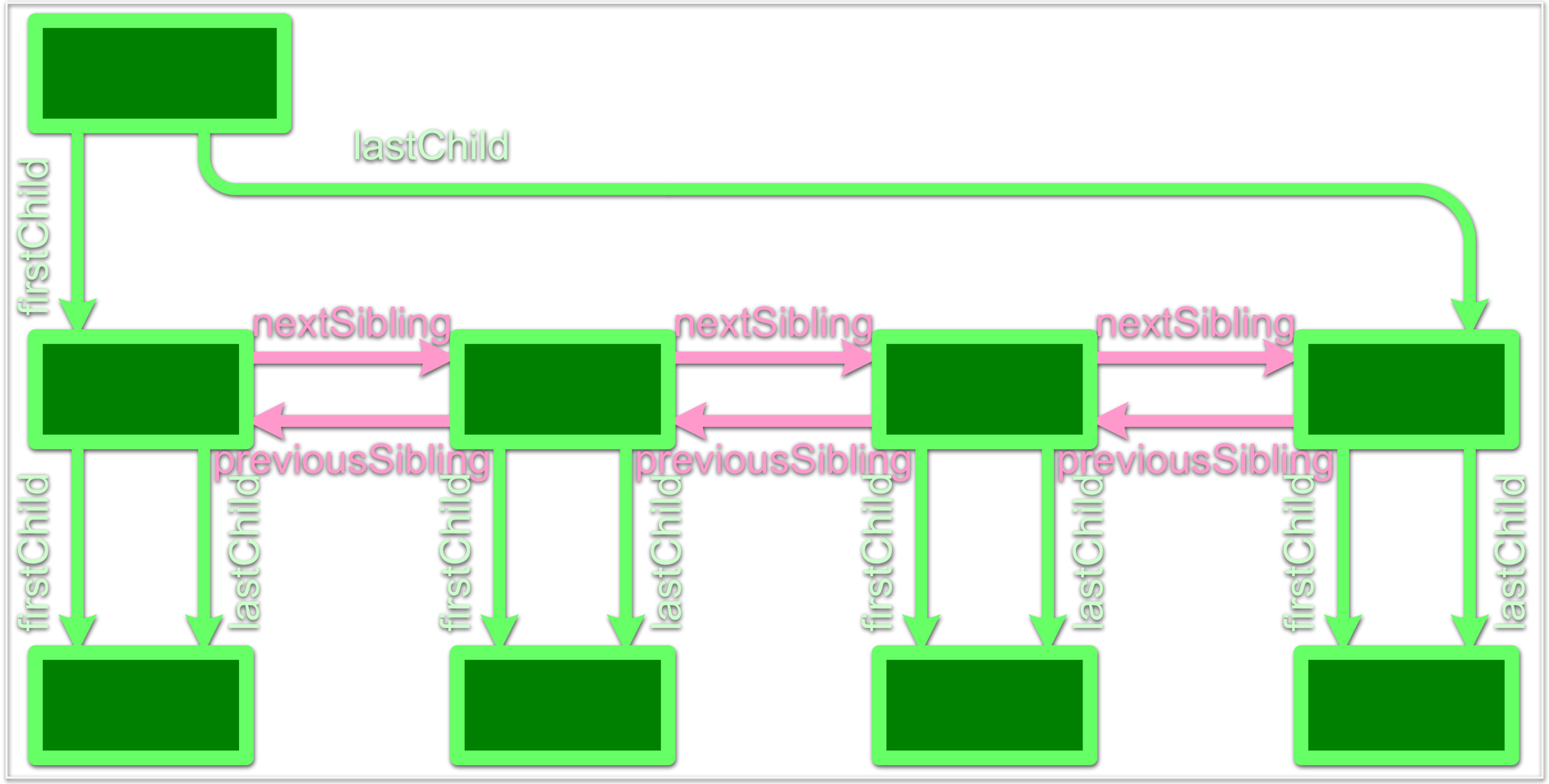
lastChild


lastChild
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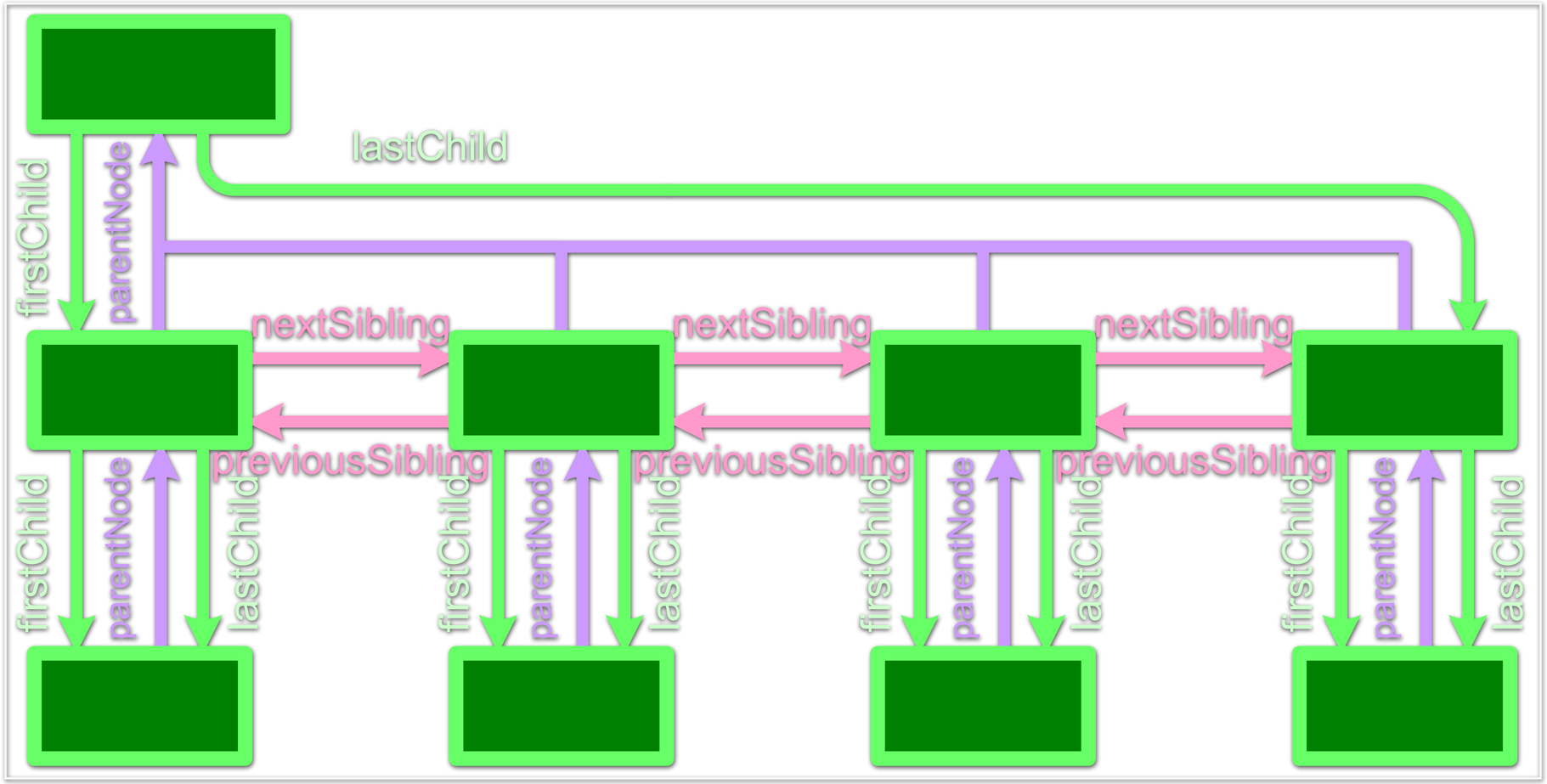
lastChild
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nextSibling
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parentNode
lastChild

Traversing the DOM

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

Changing the DOM

Changing style attributes

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

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

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.

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