ReactJS Fundamentals

What is ReactJS?

- A JavaScript library for building user interfaces (built by Facebook)
- Declarative: The state of the application determines what the UI looks like.
- Composable: create building blocks that are used to make bigger and more complicated structures

Why ReactJS?

There are so many javascript frameworks. Why do we need another?

- Speed: React is fast!
- Declarative: easier to read code and prevent bugs.
- Composable: easier to build more modular and reusable code.
- Learning how to write a React web app gives you the experience to write an app for another platform
  - iOS
  - Android
  - Windows 10

Community

- has a large community backing
- tons of support
- lots of smart people working on it
- if you have a problem, it's probably on StackOverflow

Hello World

```
<!DOCTYPE html>
<html>
<head>
    <title>Hello World</title>
    <script src="https://unpkg.com/react@15.3.2/dist/react.js"></script>
    <script src="https://unpkg.com/react-dom@15.3.2/dist/react-dom.js"></script>
    <script src="https://cdnjs.cloudflare.com/ajax/libs/babel-core/5.8.24/browser.min.js"></script>
</head>
<body>
    <div id="container"></div>

    <script type="text/babel">
        var HelloWorld = React.createClass({
            render: function() {
                return <div> Hello World </div>
            }
        });

        ReactDOM.render(<HelloWorld />, document.getElementById('container'));
    </script>
</body>
</html>
```

What's Going On Here?

- createClass: used to create a React Component (More on this to come...)
- render function: minimal property that needs to be defined on an object passed to the createClass.
- HTML in JavaScript? What?!
  ** This is not actually HTML, but something similar called JSX

React with ES6 (setup)

We're not too focused on build processes today, let's build our app with the `create-react-app` node module.

Let's build a new React app!

```
npm install -g create-react-app
create-react-app my-app
cd my-app/
npm start
```

Hello World Example using ES6.

```
//App.js
import React, { Component } from 'react';
import logo from './logo.svg';
import './App.css';

class HelloWorld extends Component {
  render() {
    return <h1>Hello World!</h1>
  }
}

class App extends Component {
  render() {
    return <HelloWorld />
  }
}

export default App;
```

How does it all work?

- Virtual DOM
- Diffing

Intro to Virtual DOM

- React uses what you return in the 'render' method to create what's called a virtual DOM.
- A virtual DOM is an in memory representation of a DOM.
- Any time the value of one of your state variables change, React will update it's Virtual DOM.
- When defining the render function, we are not trying to create the actual DOM, but the virtual DOM.
    - React will take care of rendering the actual DOM.
    - JSX is the language we use to generate the virtual DOM.

Diffing

- When React determines a change has been made it does what's called a diff on the virtual DOM.
- A diff is a comparison between to things where and how they are different.
- Once it determines where the changes have been made it updates the actual DOM of your page.
- Doing this in the virtual DOM is cheap. This is what makes React so fast!