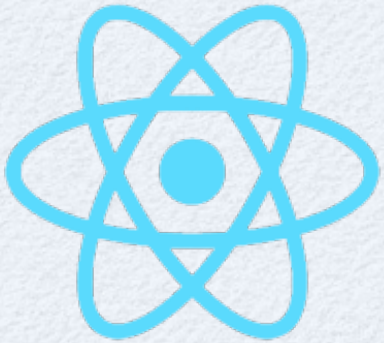

React in 30 Minutes

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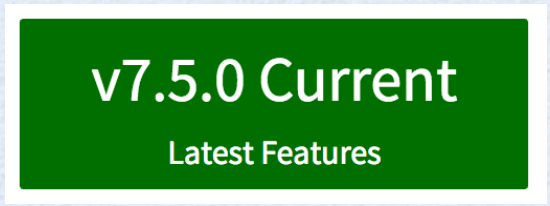
2/16/17

React

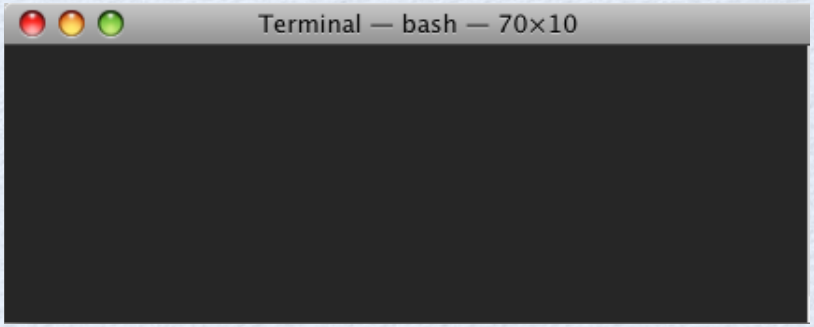
- A library for creating web applications
- One-way data flow makes applications easier to implement and understand
  - and the "virtual DOM" makes this very fast
- Components do
  - decide what to render when given certain data
  - decide what to do when events occur, like button clicks and input changes
    - often they just pass data to a function that was passed to the component
- Components do not
  - directly modify the DOM
  - modify the state of other components

Getting Started

- Browse **`nodejs.org`**
- Click "Latest Features" button to download installer for your platform

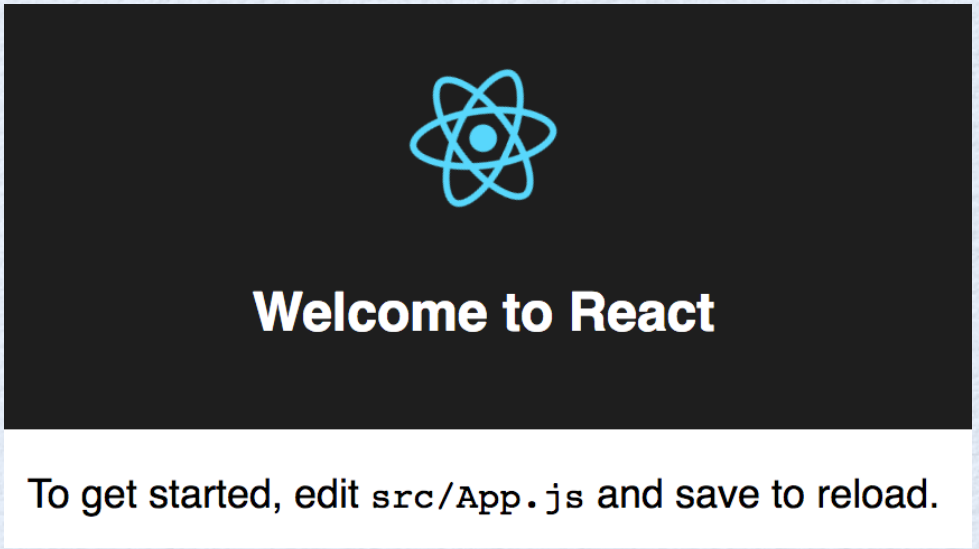


- Double-click downloaded file and follow instructions
  - installs **Node.js** and **npm**
- Open a terminal or command prompt
- Enter **`npm install -g create-react-app`**



Creating an App

- Enter **`create-react-app`** ***`app-name`***
  - takes about 20 seconds to complete because it downloads and installs many npm packages
- Enter **`cd`** ***`app-name`***
- Enter **`npm start`**
- Starts local HTTP server
- Opens default browser to local app URL



Benefits of create-react-app

- Creates directory structure and files including `package.json`
- Installs and configures many tools and libraries
- Provides a local web server for use in development
- Provides **watch and live reload**
- Uses Jest test framework which supports **snapshot tests**
- Lets Facebook maintain the build process
  - future benefits from future improvements
- "npm build" produces small production deploys

Notable Packages Installed

- **Babel** - JavaScript transpiler (ES6+ to ES5) and more
- **ESLint** - pluggable JavaScript linter
- **Istanbul** - code coverage tool
- **Jest** - JavaScript test framework supporting snapshot tests
- **Lodash** - JavaScript utility library
- **PostCSS** - tool for transforming styles with plugins
  - "can lint CSS, support variables and mixins, transpile future CSS syntax, inline images, and more"
- **React** - of course
- **ReactDOM** - provides DOM-specific methods
- **react-scripts** - scripts and configuration used by create-react-app
  - source of future benefits
- **SockJS** - WebSocket emulation (tries to use native WebSockets first)
- **UglifyJS** — JavaScript parser/compressor/beautifier
- **Webpack** - module and asset bundler
- **webpack-dev-server** - an Express server that servers a webpack bundle
- **whatwg-fetch** - polyfill for Fetch API used to make REST calls

create-react-app Scripts

- **`package.json`** file generated by create-react-app defines several scripts
- **`npm start`**
  - starts webpack-dev-server and opens browser to the app
- **`npm test`**
  - runs Jest-based tests under **`__tests__`** directory
- **`npm run build`**
  - creates a compressed, production build
  - produces many files in a new **`build`** directory
  - most important are
    `index.html`,
    `static/css/main.`*`hash`*`.css`, and
    `static/js/main.`*`hash`*`.js`
  - **`index.html`** refers to the **`.css`** and **`.js`** files

State and Props

- Two ways data is provided to a component
- Values of **props** never change
- Values of **state** can change over the life of components
- **Props** are passed to components via what look like HTML attributes
- The type of each prop can be described using **`React.Proptypes`**
  - provides error checking during development
- **State** is initially provided by component definitions
  and is updated by calls to **`this.setState(newState)`**
  - causes the component to re-render using Virtual DOM diffing
- Larger applications often use **Redux** to manage application state
  - overkill for small to medium sized applications

Component Types

- Stateless functional components
  - defined by a single function
  - get data from props
  - do not hold state

```
const Greeting = ({name}) =>
  <h1>Hello, {name}!</h1>;
```

- Class-based components
  - defined by a class that extends `React.Component`
  - get data from props
  - can hold state
  - can define lifecycle methods like `componentDidMount` and `shouldComponentUpdate`

```
class Greeting extends React.Component {
  render() {
    return <h1>Hello, {this.props.name}!</h1>;
  }
}
```

JSX - JavaScript XML

- A syntax for specifying what components should render
- Looks very **similar to HTML**
- HTML element names must be lowercase
- Custom element names must start uppercase
- **Props** look like attributes and must use **camel-case**, not snake-case
  - ex. `onClick`, not `on-click`
- Values of event handling props must be references to functions
  - ex. `onClick={this.handleClick}`
- Converted to calls to JavaScript functions by Babel plugin "transform-react-jsx"
  - browsers do not understand JSX syntax

Time to Look at Code!

https://github.com/mvolkmann/react-swapper

- **Select** in **src/select.js**
  - a list of strings that supports a single selection
  - implemented with a stateless functional component
- **Swapper** in **src/swapper.js**
  - renders two Select components with two buttons between them for moving items from one Select to the other
  - implemented with a class-based component
- **App** in **src/App.js**
  - renders a Swapper for selecting favorite ice cream flavors
- CSS in **src/App.css**
  - uses Flexbox to layout all components