SIX LESSONS IN REACT JS

LESSON 0

INTRODUCTION, JSX, THE VIRTUAL DOM, AND FLUX

INTRODUCTION

WHAT ARE WE DOING HERE?

FRONTEND
FROM A NOVICE PERSPECTIVE

SKILLS
TO BUILD YOUR PROJECT

INSPIRATION
TO GO LEARN MORE

CODE
THAT RUNS AND RUNS WELL

HOW DOES THIS WHOLE THING WORK?

SIX WEEKS

ONE HOUR A WEEK

SLIDES

FOR BRIEF BACKGROUND

TUTORIALS

FOR HANDS ON LEARNING

EXERCISES

PROGRESSIVELY BUILD A THING

MODERN WEB APPLICATIONS ARE HARD

DATA
CHANGES ON THE FLY

TEMPLATES
HUNDREDS OF THEM

VIEWS
OVERLY COMPLEX

EVENTS
HARD TO MANAGE

MEMORY
LEAKS EVERYWHERE

RENDERING
TAKES A TON OF TIME

WHAT IS REACT JS

LIGHTWEIGHT OPEN-SOURCE JS LIBRARY

SIMPLE

MANAGES ALL UI UPDATES

DECLARATIVE

ONLY CHANGES UPDATED UI

COMPOSABLE

BUILD REUSABLE COMPONENTS

WHY USE IT?

COMPONENTS ARE THE FUTURE

CUSTOMIZABLE

EASILY SUBCLASSED AND FLEXIBLE

REUSABLE

BUILD A UI LIBRARY

NESTABLE

EASY MANAGEMENT OF DESCENDANTS

EFFICIENCY GAINS

VIRTUAL DOM

FEWER REDRAWS

MEMORY LIGHT

AUTOBINDING & SINGLE EVENT HANDLER

LESS TYPING

TEMPLATES AND VIEWS IN ONE PLACE

A HUGE COMMUNITY

WhatsApp

JSX

STATICALLY-TYPED

OBJECT-ORIENTED

XML-LIKE SYNTAX

ECMASCRIPT EXTENSION

```
var HelloMessage = React.createClass({
  render: function() {
    return <div>Hello {this.props.name}</div>;
  }
});

React.render(<HelloMessage name="John" />,
mountNode);
```

WHAT IS THE POINT OF JSX?

FASTER

OPTIMIZED ON COMPILATION

SAFER

STATICALLY TYPED AND TYPE-SAFE

EASIER

SOLID CLASS SYSTEM AND FAMILIARITY

JSX TRANSFORMATION

```
var HelloMessage = React.createClass({
  render: function() {
    return <div>Hello {this.props.name}</div>;
  }
});

React.render(<HelloMessage name="John" />, mountNode);
```

TO

```
var HelloMessage = React.createClass({displayName: "HelloMessage",
  render: function() {
    return React.createElement("div", null, "Hello ", this.props.name);
  }
});

React.render(React.createElement(HelloMessage, {name: "John"}), mountNode);
```

IN-BROWSER TRANSFORMATION

```
<!DOCTYPE html>
<html>
  <head>
    <script src="build/react.js"></script>
    <script src="build/JSXTransformer.js"></script>
  </head>
  <body>
    <div id="example"></div>
    <script type="text/jsx">
      React.render(
        <h1>Hello, world!</h1>,
        document.getElementById('example')
      );
    </script>
  </body>
</html>
```

PRE-COMPILED TRANSFORMATION

```
npm install -g react-tools
jsx --watch src/ build/
```

build/helloworld.js

```
React.render(
  React.createElement('h1', null, 'Hello, world!'),
  document.getElementById('example')
);
```

HTML FILE

```
<html>
  <head>
    <script src="build/react.js"></script>
  </head>
  <body>
    <div id="example"></div>
    <script src="build/helloworld.js"></script>
  </body>
</html>
```

UPDATING THE DOM

VIRTUAL DOM (PRE)

```
<h1>Header about things</h1>
  <ul>
    <li>Thing 1</li>
    <li>Thing 2</li>
  </ul>
```

VIRTUAL DOM (POST)

```
<h1>Header about things</h1>
  <ul>
    <li>Thing 1</li>
    <li>Thing 2</li>
    <li>Thing 3</li>
  </ul>
```

DIFF

PATCH

```
<li>Thing 3</li>
```

APPLY

REAL DOM (PRE)

```
<h1>Header about things</h1>
  <ul>
    <li>Thing 1</li>
    <li>Thing 2</li>
  </ul>
```

```
<li>Thing 3</li>
```

STREAM OF DOM OPERATIONS

REAL DOM (POST)

```
<h1>Header about things</h1>
  <ul>
    <li>Thing 1</li>
    <li>Thing 2</li>
    <li>Thing 3</li>
  </ul>
```

CHANGE DETECTION IN THE VIRTUAL DOM

VIRTUAL DOM (PRE)

```
<h1>Header about things</h1>
  <ul>
    <li>Thing 1</li>
    <li>Thing 2</li>
  </ul>
```

DIFF

VIRTUAL DOM (POST)

```
<h1>Header about things</h1>
  <ul>
    <li>Thing 1</li>
    <li>Thing 2</li>
    <li>Thing 3</li>
  </ul>
```

ASSUMPTIONS

COMPONENTS

SAME CLASS > SIMILAR TREE

DIFFERENT CLASS > DIFFERENT TREE

UNIQUE KEYS

OPTIONAL ATTRIBUTE

STABLE ACROSS RENDERS

PAIR-WISE DIFFING

DIFFERENT NODE TYPES

```
renderA: <div />
renderB: <span />
=> [removeNode <div />], [insertNode <span />]
```

EVEN ON CUSTOM COMPONENTS

```
renderA: <Header />
renderB: <Content />
=> [removeNode <Header />], [insertNode <Content />]
```

IMMEDIATE REPLACEMENT OF THE NODE

PAIR-WISE DIFFING

CHANGED ATTRIBUTES

```
renderA: <div id="before" />
renderB: <div id="after" />
=> [replaceAttribute id "after"]
```

KEY VALUE PAIRS FOR STYLES

```
renderA: <div style={{color: 'before'}}/>
renderB: <div style={{fontWeight: 'bold'}}/>
=> [removeStyle color], [addStyle font-weight 'bold']
```

UPDATE ATTRIBUTES AND RECURSE

LIST-WISE DIFFING

INSERT AT END

```
renderA: <div><span>first</span></div>
renderB: <div><span>first</span><span>second</span></div>
=> [insertNode <span>second</span>]
```

INSERT AT BEGINNING

```
renderA: <div><span>first</span></div>
renderB: <div><span>second</span></div><div><span>first</span></div>
=> [replaceAttribute textContent 'second'], [insertNode <span>first</span>]
```

MUTATIONS DIFFS ARE COMPLEX AND SLOW

LIST-WISE DIFFING

USE KEYS AS OPTIONAL ATTRIBUTES

```
renderA: <div><span key="first">first</span></div>
renderB: <div><span key="second">second</span></div><div><span key="first">first</span></div>
=> [insertNode <span>second</span>]
```

FINDING A STABLE, UNIQUE KEY IS EASY

FLUX

DISPATCHER

STORES

VIEWS

ACTIONS

UNIDIRECTIONAL DATA FLOW

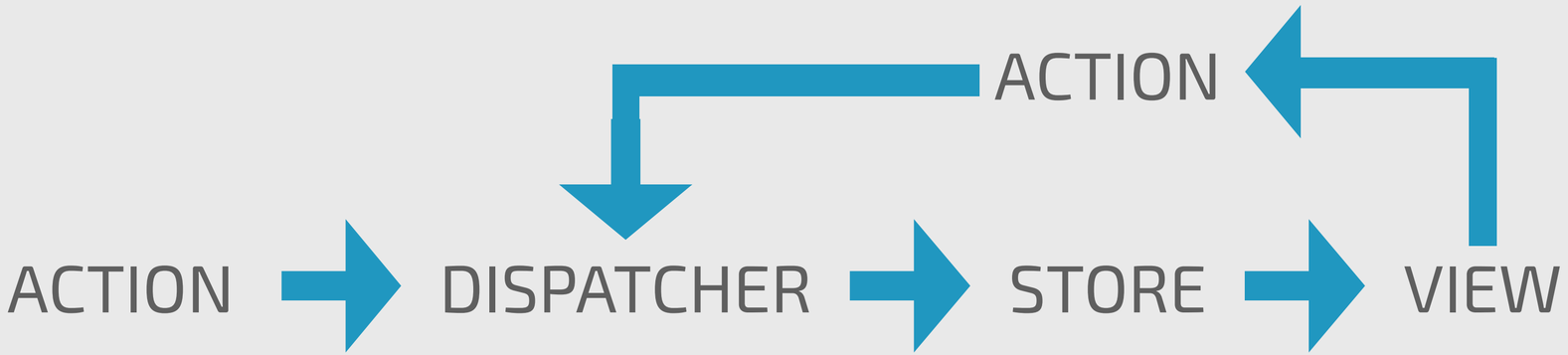
DISPATCHER, STORES, AND VIEWS

INDEPENDENT NODES WITH DISTINCT I/O

ACTIONS

OBJECTS CONTAINING DATA AND TYPE

UNIDIRECTIONAL DATA FLOW WITH USER INPUT



USER INTERACTION

VIEWS SEND ADDITIONAL ACTIONS TO DISPATCHER

FLUX DISPATCHER

CENTRAL HUB

FOR DATA FLOW THROUGH APP

REGISTER

CALLBACKS AND ASSOCIATED STORES

MANAGES

STORES AND THEIR DEPENDENCIES

FLUX STORES

STATE & LOGIC

SIMILAR TO AN MVC MODEL

MANAGES DOMAIN NOT A SINGLE RECORD

SUBSCRIBE TO CERTAIN ACTIONS

ONLY UPDATED BY ACTION VIA DISPATCHER

FLUX ACTIONS

SYNCHRONOUS

SEMANTICALLY DESCRIPTIVE

DO NOT CASCADE