Comp 322/422 - Software Development for Wireless and Mobile Devices

Fall Semester 2017 - Week 12 - React & React Native Notes

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Contents

Final Demo and Presentation

Presentation & demo: 8th December 2017 @ 2.45pm

Course total = 40%

- continue to develop your app concept and prototypes
  - *develop application using any of the technologies taught during the course*
  - *again, combine technologies to best fit your mobile app*
- if the app uses Apache Cordova
  - *implement a custom Cordova plugin for a native mobile OS*
  - *e.g. Android or iOS*
- produce a working app
  - *as far as possible try to create a fully working app*
  - *explain any parts of the app not working...*
- explain choice of technologies for mobile app development
  - *e.g. data stores, APIs, modules, &c.*
- explain design decisions
  - *outline what you chose and why?*
  - *what else did you consider, and then omit? (again, why?)*
- which concepts could you abstract for easy porting to other platform/OS?
- describe patterns used in design of UI and interaction

Final Report

Report due on 15th December 2017 by 2.45pm

- final report outline - coursework section of website
  - *PDF*
  - *group report*
  - *extra individual report*

Group Updates

- what is currently working?
- which data store?
- what is left to add or fix? features, UI elements, interactions...
- who is working on what? logic, design, testing, research...
- ...

groups

- group a
- group b
- group c
- group d
- group e
- group f
- group g

React JavaScript Library

getting started - part 1

- many different options for using React
- create a new app using React
  - *e.g. Create React App - GitHub*
- add React to an existing app
  - *e.g. using NPM to install React and depencies*

```
npm init
npm install --save react react-dom
```

- import React into a project using the standard Node `import` options, e.g.

```
import React from 'react';
import ReactDOM from 'react-dom';
```

React JavaScript Library

getting started - part 2

- for earlier versions of React and JSX
  - *pre-compile JSX into JavaScript before deploying our application*
  - *used React's JSXTransformer option to compile and monitor JSX for dev projects*
- as React has evolved over the last year
  - *still use this underlying concept*
  - *Babel in-browser JSX transformer for explicit ES6 support (if required...)*
- Babel will add a check to our app to allow us to use JSX syntax
  - *React code then understood by the browser*
- dynamic transformation works well for most test scenarios
  - *preferable to pre-compile for production apps*
  - *should help to make an app faster for production usage*

React JavaScript Library

JSX - intro

- JSX stands for **JavaScript XML**
  - *follows an XML familiar syntax for developing markup within React components*
- JSX is not compulsory within React
  - *might be omitted due to compile requirements for an app*
- JSX may be useful for an app
  - *it makes components easier to read and understand*
  - *its structure is more succinct and less verbose*
- A few defining characteristics of JSX
  - *each JSX node maps to a function in JavaScript*
  - *JSX does not require a runtime library*
  - *JSX does not supplement or modify the underlying semantics of JavaScript*

React Native

JSX intro and usage

- Facebook considers JSX as a XML-like extension to ECMAScript
  - *without any defined semantics*
  - *NOT intended to be implemented by engines or browsers*
  - *not a proposal to incorporate JSX into the ECMAScript spec itself*
  - *used to transform syntax into standard ECMAScript*
- for React Native
  - *these JavaScript objects are passed to the React Native Bridge*
  - *then translated into native components.*
- e.g. a standard `<Text>` component in JSX may be written as follows

```
<Text style={styles.description}>
  A test React Native app...
</Text>
```

- JSX will then be transpiled by the React Native bridge into the following JavaScript

```
React.createElement(
  Text,
  { style: styles.welcome },
  "A test React Native app..."
);
```

React Native

JSX hierarchies

- benefit of JSX with React Native is its use with hierarchies
  - *such as a standard `<View>` and nested `<Text>` component structure*

```
<View style={styles.container}>
  <Text style={styles.description}>
    A test React Native app...
  </Text>
</View>
```

- transpiled into the following JavaScript

```
React.createElement(
  View,
  null,
  React.createElement(
  Text,
  { style: styles.welcome },
  "A test React Native app..."
  )
);
```

JSX children

- a primary feature of JSX with React Native
  - *option to pass children to a React component*
  - *enables effective component composition*
- seen regularly with hierarchy composition
  - *e.g. hierarchy of `<View>` and `<Text>`*

```
<View style={styles.container}>
  <Text style={styles.description}>
    A test React Native app...
  </Text>
</View>
```

- we may create a simple component and encapsulate this structure

```
class Container extends Component {
  render() {
    return (
      <View style={styles.container}>{ this.props.children }</View>
    )
  }
}
```

- then reuse this component as necessary

```
<Container>
  <Text style={styles.description}>
    A test React Native app...
  </Text>
</Container>
```

JSX props and children

- seen example usage of props with styles, data, and now *children*
- as we pass a standard prop, such as `style`
  - *passing a property to the defined React component*
- property is accessible inside this component using the standard syntax

```
this.props.propName
```

- as we define a component
  - *children is default prop React passes to this component for the hierarchy*
  - *becomes the component reference for any children in this hierarchy*

```
this.props.children
```

React JavaScript Library

JSX - benefits

- why use JSX, in particular when it simply maps to JavaScript functions?
- many of the inherent benefits of JSX become more apparent
  - *as an application, and its code base, grows and becomes more complex*
- benefits can include
  - *a sense of familiarity - easier with experience of XML and DOM manipulation*
  - *eg: React components capture all possible representations of the DOM*
  - *JSX transforms an application's JavaScript code into semantic, meaningful markup*
  - *permits declaration of component structure and information flow using a similar syntax to HTML*
  - *permits use of pre-defined HTML5 tag names and custom components*
  - *easy to visualise code and components*
  - *considered easier to understand and debug*
  - *ease of abstraction due to JSX transpiler*
  - *abstracts process of converting markup to JavaScript*
  - *unity of concerns*
  - *no need for separation of view and templates*
  - *React encourages discrete component for each concern within an application*
  - *encapsulates the logic and markup in one definition*

JSX - composite components

- example React component might allow us to output a custom heading

```
class OutputHeading extends Component {
  render() {
    return (
      // render passed props `output` value, pass heading size...
      <Text style={this.props.style}>{this.props.output}</Text>
    );
  }
}
```

- currently return a standard `Text` component
- now update this example to work with dynamic values
- JSX considers values dynamic if they are placed between curly brackets `{..}`
  - *treated as JavaScript context*

```
<OutputHeading output='Component Heading Tester' style={styles.heading3} />
```

JSX - conditionals

- a component's markup and its logic are inherently linked in React
- this naturally includes *conditionals*, *loops*...
- adding `if` statements directly to JSX will create invalid JavaScript

1. ternary operator

```
...
this.state.isComplete ? 'is-complete' : ''
...
```

2. variable

```
getIsComplete: function() {
  return this.state.isComplete ? 'is-complete' : '';
},
render() {
  var isComplete = this.getIsComplete();
  return (
    <Test complete={isComplete}>...</Test>
  );
}
```

3. function call

```
getIsComplete: function() {
  return this.state.isComplete ? 'is-complete' : '';
},
render() {
  return (
    <Test complete={this.getIsComplete()}>...</Test>
  );
}
```

- to handle React's lack of output for *null* or *false* values
  - *use a boolean value and follow it with the desired output*

JSX - special considerations for attributes - part 1

- in JSX, there are special considerations for attribute
  - *`key`*
  - *`ref`*

    1. `key`

- an optional unique identifier that remains consistent throughout render passes
- informs React so it can more efficiently select when to reuse or destroy a component
- helps improve the rendering performance of the application.
- eg: if two elements already in the DOM/View need to switch position
  - *React is able to match the keys and move them*
  - *does not require unnecessary re-rendering of the complete DOM/View*

JSX - special considerations for attributes - part 2

2. `ref`

- `ref` permits parent components to easily maintain a reference to child components
  - *available outside of the render function*
- to use `ref`, simply set the attribute to the desired reference name

```
render() {
  return (
    <TextInput ref='myInput' ... />
  );
}
```

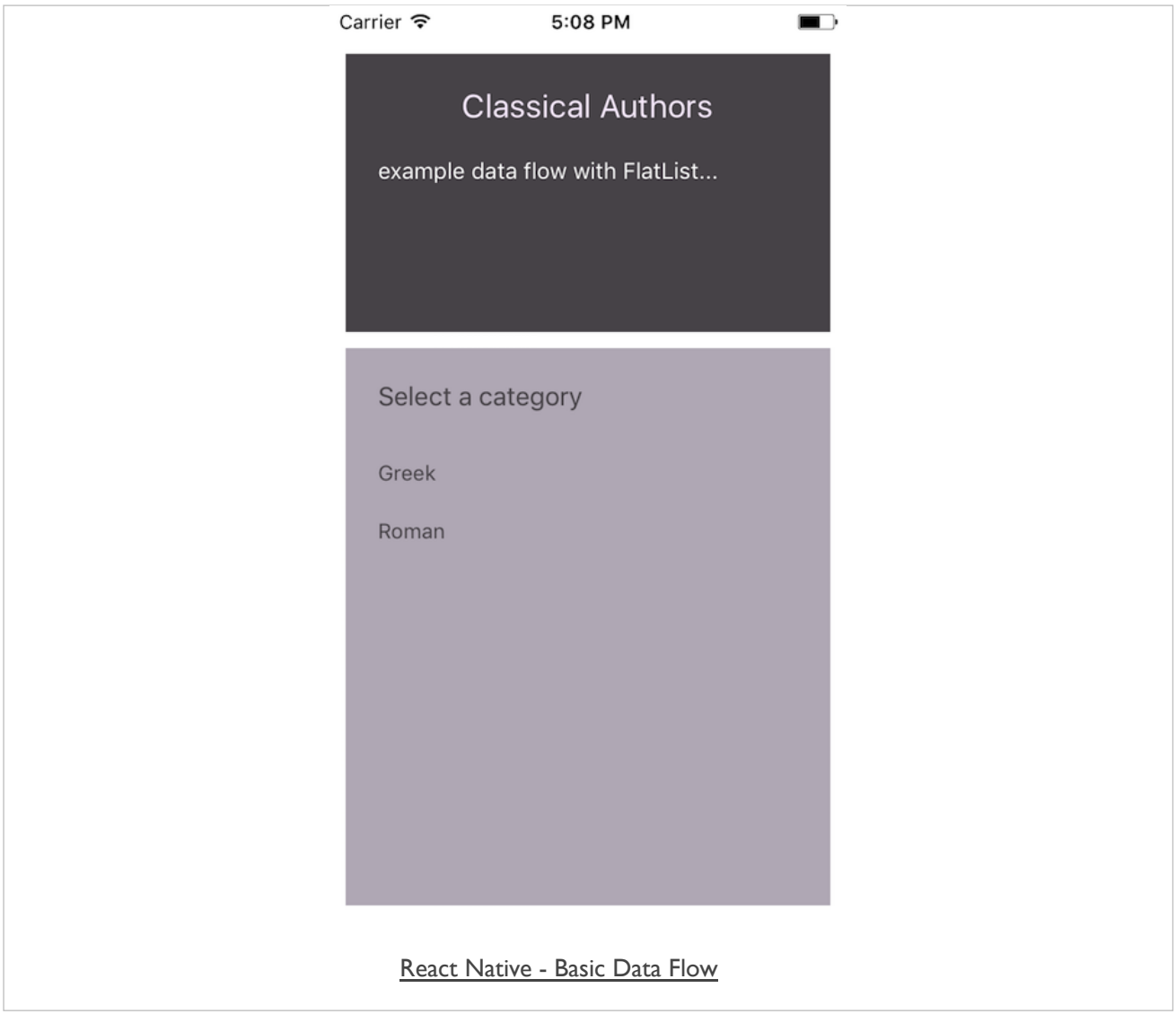
- able to access this `ref` using the defined `this.refs.myInput`
  - *access anywhere in the component*
  - *object accessed through this `ref` known as a backing instance*
- **NB:** not the actual DOM/View
  - *a description of the component React uses to create the view when necessary*

data flow

- data flows in one direction in React
  - *namely from **parent to child***
- helps to make components nice and simple, and predictable as well
- components take *props* from the parent, and then render
- if a *prop* has been changed, for whatever reason
  - *React will update the component tree for that change*
  - *then re-render any components that used that property*
- Internal state also exists for each component
  - *state should only be updated within the component itself*
- we can think of data flow in React
  - *in terms of* `props` *and* `state`

Image - React Native - Data Flow

basic data flow with FlatList



React Native - Basic Data Flow

React Native - Data Flow

basic data flow with FlatList - example

```
// custom abstracted component - expects props for list data...
class ListClassics extends Component {
  render() {
    return (
      <FlatList
        data={this.props.data}
        renderItem={({item}) => <Text style={styles.listItem}>{item.key}</Text>}
      />
    );
  }
}

// default component - use View container, render list &c. with passed props...
export default class DataFlow extends Component {
  render() {
    let classics = [{ key: 'Greek'}, {key: 'Roman'}];
    return (
      <View style={styles.container}>
        <View style={styles.headingBox}>
          <Text style={styles.heading1}>
            {intro.heading}
          </Text>
          <Text style={styles.content}>
            {intro.description}
          </Text>
        </View>
        <View style={styles.listBox}>
          <ListClassics data={classics} />
        </View>
      </View>
    );
  }
}
```

data flow - `props` - part I

- `props` can hold any data and are passed to a component for usage
- set `props` on a component during instantiation

```
let classics = [{ key: 'Greek'}, {key: 'Roman'}];
<ListClassics classics={classics}/>
```

- also use the `setProps` method on a given instance of a component

```
var ListClassics = React.createClass({
  render: function() {
    return (
      <li className="classic">{this.props.classics}</li>
    );
  }
});

var classics = [{ key: 'Greek'}];
var listClassics = React.render (
  <ListClassics/>,
    document.getElementById('example')
);

listClassics.setProps({ classics: classics });
```

data flow - `setNativeProps`

- React Native has a similar option called `setNativeProps`
- React.js may directly manipulate a DOM node
- likewise, we may need to directly modify or maniupulate a mobile app
- React Native documentation recommend such usage as follows,

> *Use setNativeProps when frequent re-rendering creates a performance bottleneck*

- not recommended for frequent use
- we may need to use it for
  - *regular animation updates*
  - *form management*
  - *graphics...*
- use with care

data flow - `setNativeProps` example

- define function for `clearTextInput`

```
clearTextInput = () => {
    this._textInput.setNativeProps({text: ''});
  }
```

- call `clearTextInput()` function on touch press

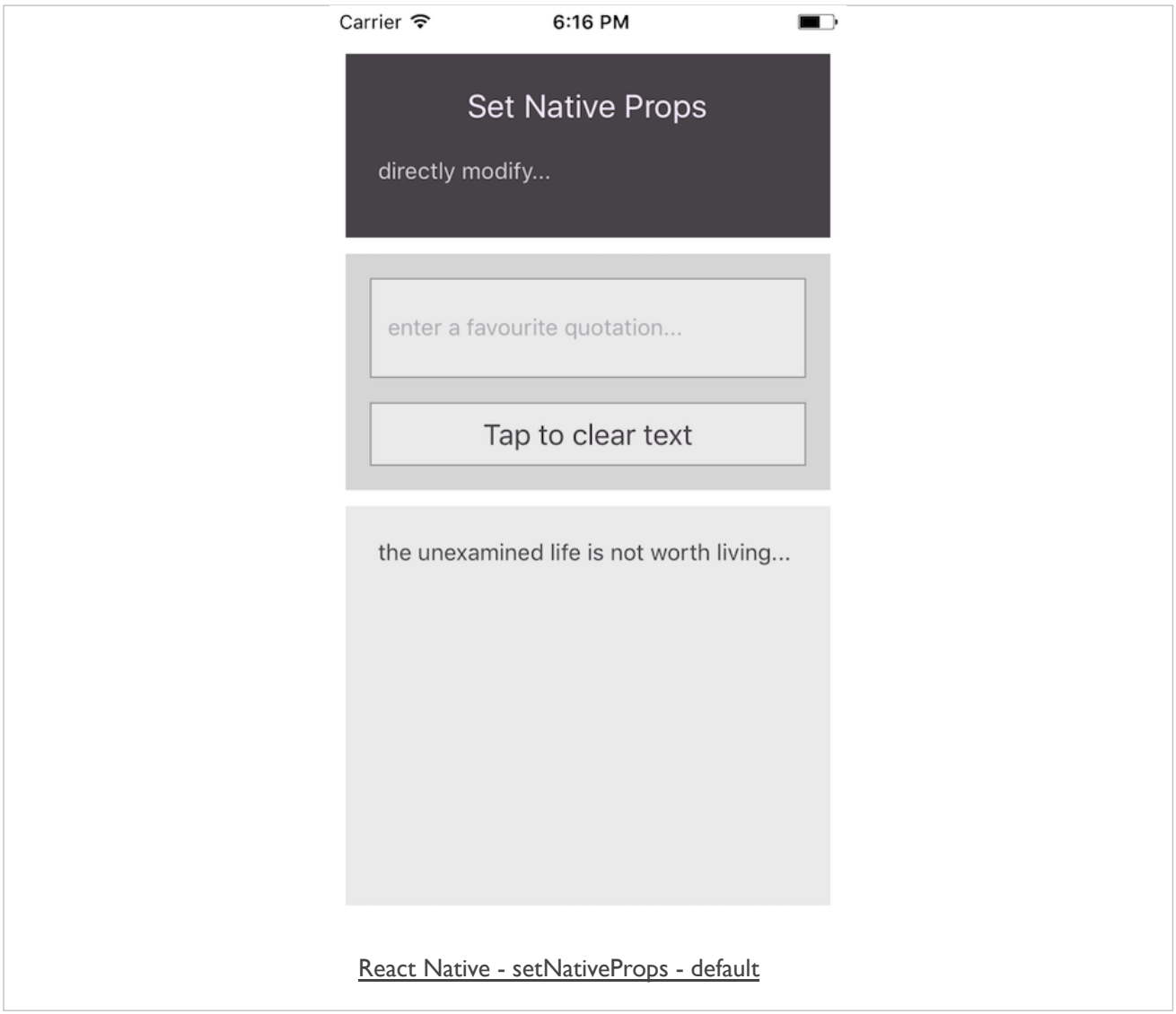
```
<Button
    onPress={this.clearTextInput}
    title='Tap to clear text'
  color='#585459'
/>
```

- add TextInput component and define reference

```
<TextInput
  //arrow function call to set value to current component...
  ref={component => this._textInput = component}
  style={styles.textInput}
  placeholder={this.state.quoteInput}
  onChangeText={(quoteText) => this.setState({quoteText})}
  selectionColor='#585459'
/>
```

Image - React Native - Data Flow

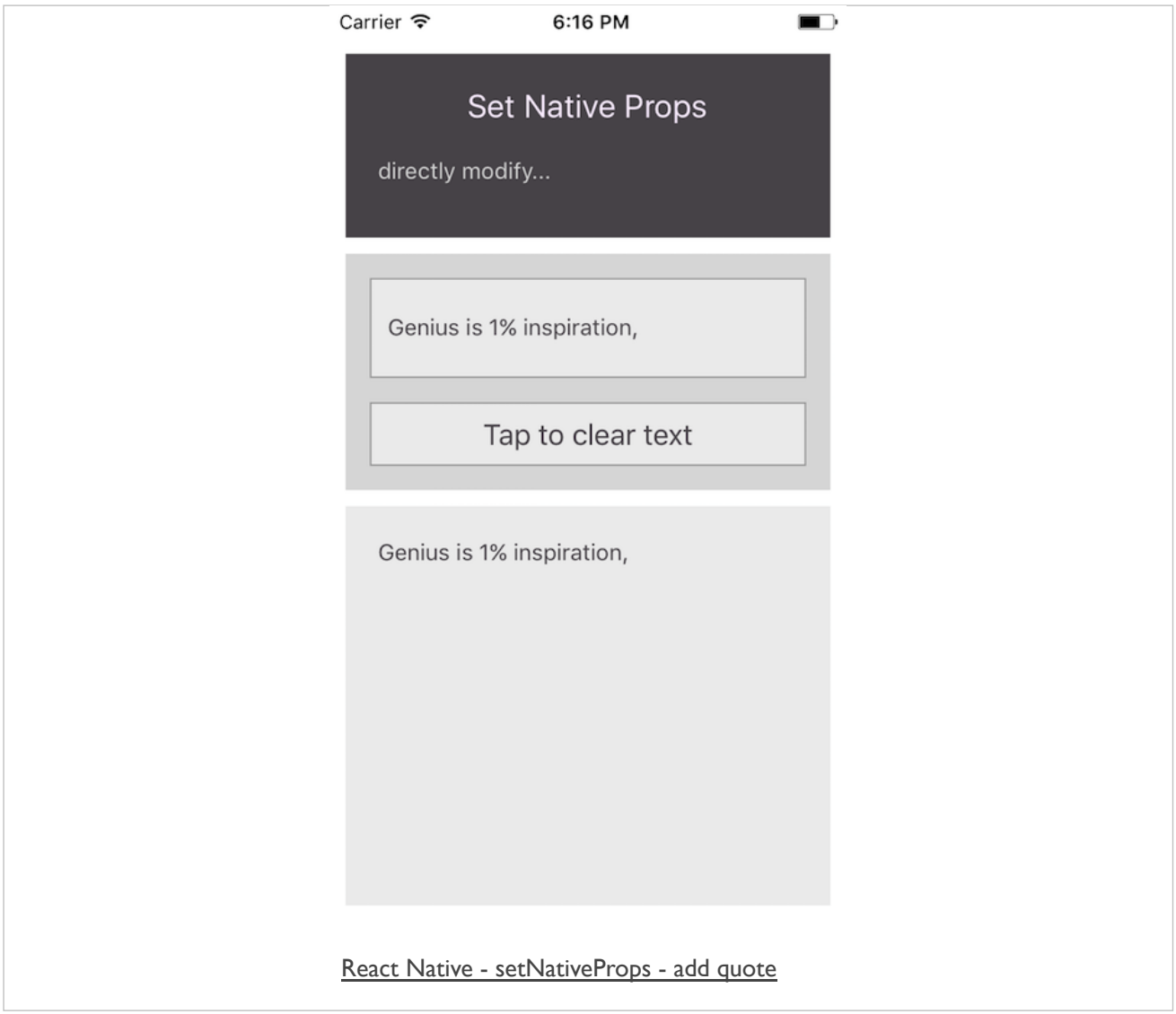
`setNativeProps` example - default



React Native - setNativeProps - default

Image - React Native - Data Flow

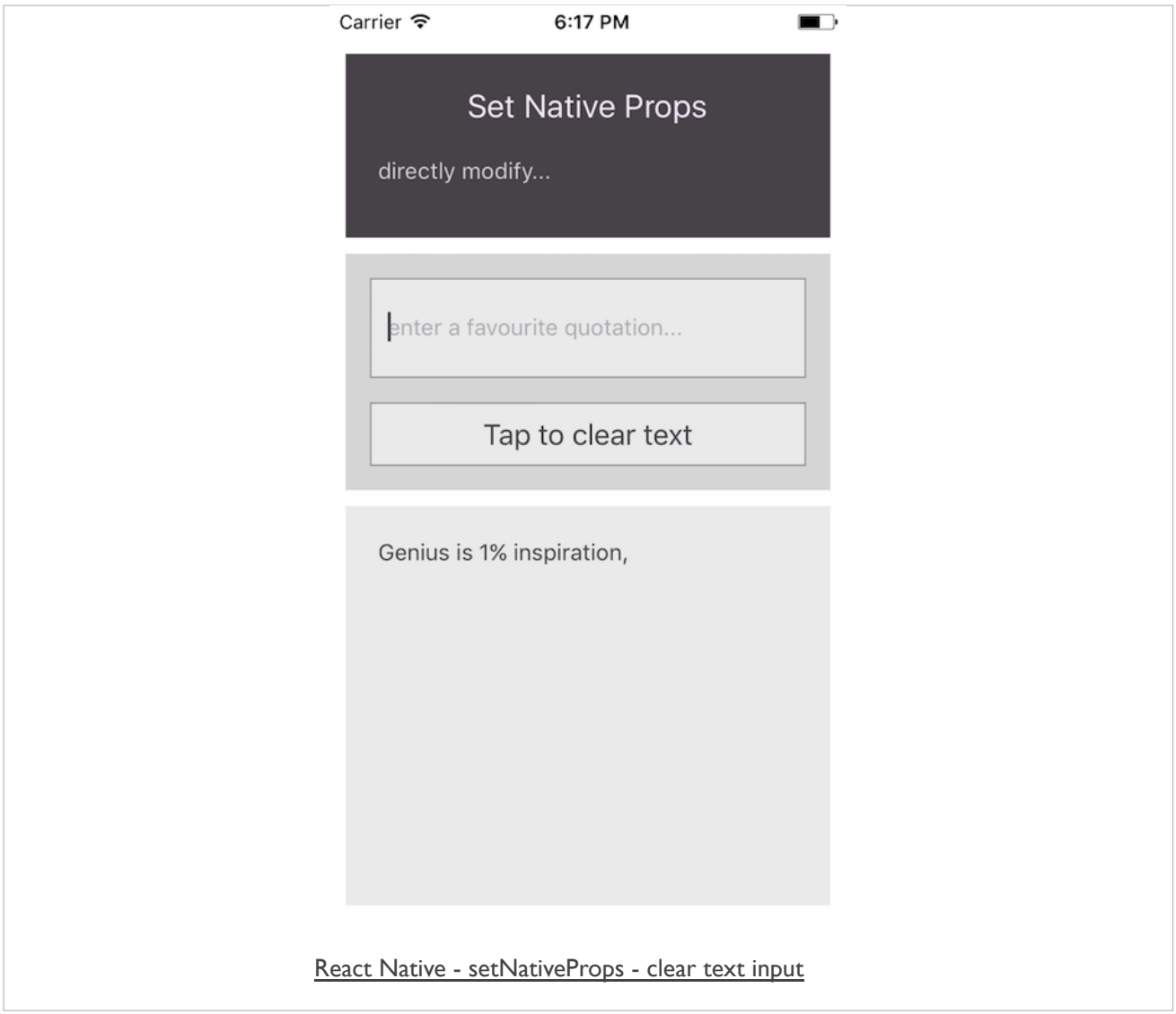
`setNativeProps` example - add quote



React Native - setNativeProps - add quote

Image - React Native - Data Flow

`setNativeProps` example - clear text input



React Native - setNativeProps - clear text input

React JavaScript Library - non-ES6

state - intro - part I

- a component in React is able to house *state*
- *State* is inherently different from `props` because it is internal to the component
- it is particularly useful for deciding a view state on an element
  - *eg: we could use state to track options within a hidden list or menu*
  - *track the current state*
  - *change it relative to component requirements*
  - *then show options based upon this amended state*
- **NB:** considered bad practice to update state directly using `this.state`
  - *use the method `this.setState`*
- try to avoid storing computed values or components directly in *state*
- focus upon using simple data
  - *directly required for given component to function correctly*
- considered good practice to perform required calculations in the `render` function
- try to avoid duplicating `prop` data into `state`
  - *use the `props` data instead*

React JavaScript Library - non-ES6

state - intro - part 2

```
var EditButton = React.createClass({
  getInitialState: function() {
    return {
      editShow: true
    };
  },
  render: function() {
    if (this.state.editShow == false) {
      alert('edit button will be turned off...');
    }
    return (
      <button className="button edit" onClick={this.handleClick}>Edit</button>
    );
  },
  handleClick: function() {
  //handle click...
  alert('edit button clicked');
  //set state after button click
  this.setState({ editShow: false });
  }
});
```

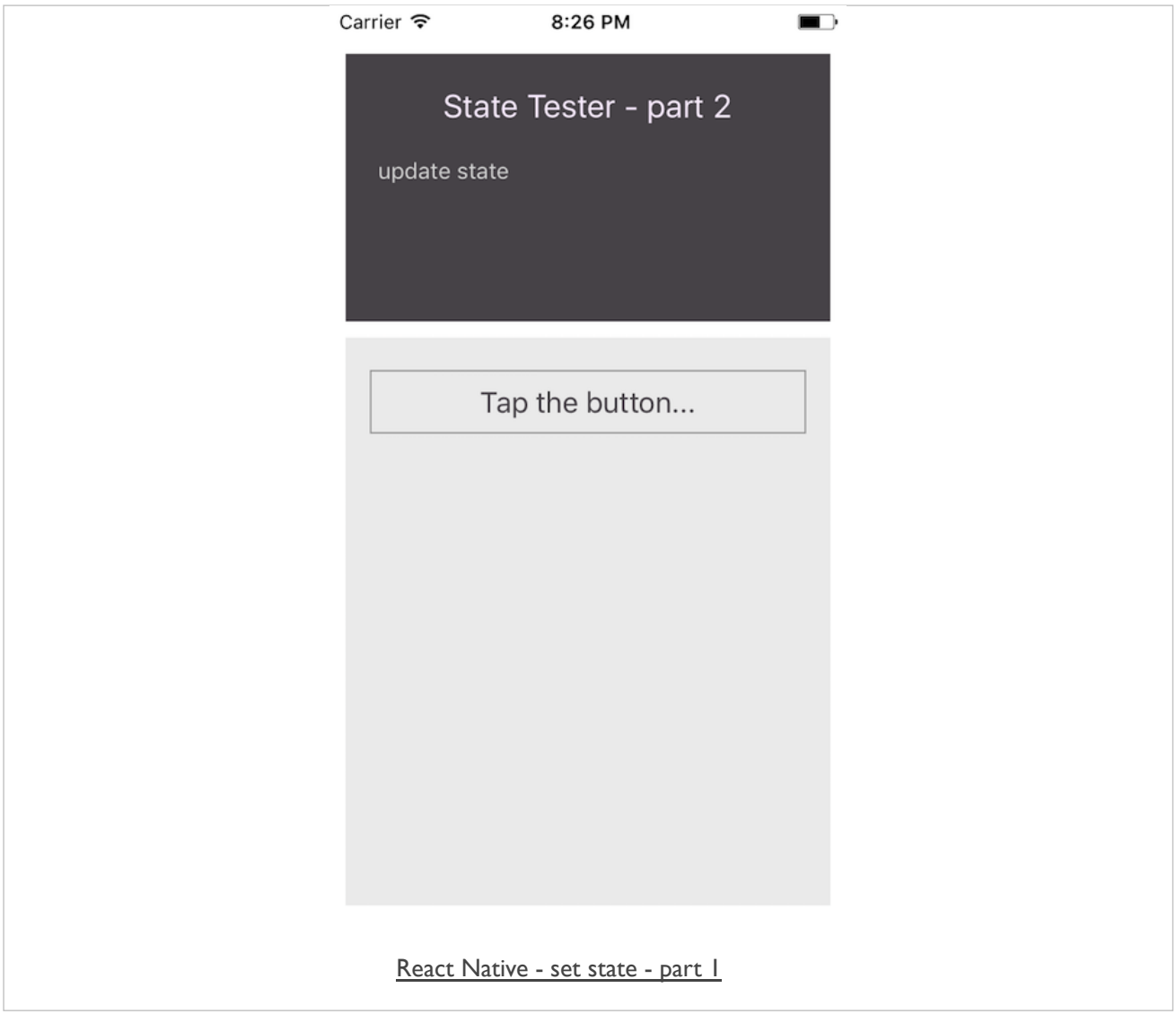
React Native - State

component and constructor

```
// abstracted component for rendering *tape* text
class EditButton extends Component {
  // instantiate object - expects props parameter, e.g. text & value
  constructor(props) {
    // calls parent class' constructor with `props` provided - i.e. uses Component to setup props
    super(props);
    // set initial state - e.g. text is shown
    this.state = { editShow: true };
  }
  // custom function to modify state on button click
  handleClick = () => {
    //set state after button click
    this.setState({ editShow: false });
  }
  // component render - check state of component...
  render() {
    if (this.state.editShow == false) {
      return (
        <Text style={styles.content}>
          Button has been removed...
        </Text>
      );
    } else {
      return (
        <View style={styles.buttonBox}>
          <Button
            onPress={this.handleClick}
            title={this.props.title}
            color='#585459'
          />
        </View>
      );
    }
  }
}
```

Image - React Native - Set State

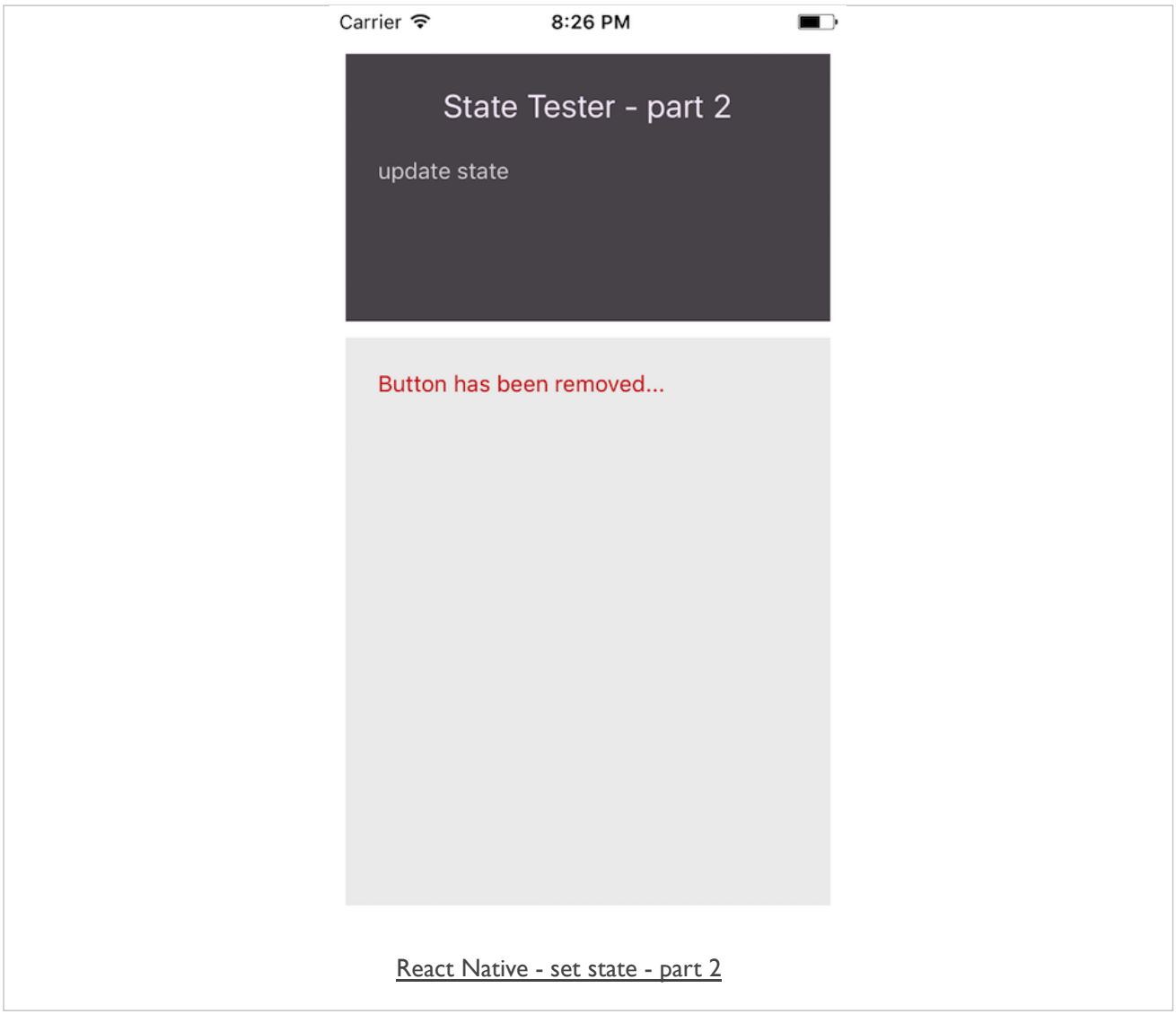
component and constructor



React Native - set state - part 1

Image - React Native - Set State

component and constructor



React Native - set state - part 2

React JavaScript Library - non-ES6

state - intro - part 3

- when designing React apps, we often think about
  - ***stateless children*** *and a* ***stateful parent***

> *A common pattern is to create several stateless components that just render data, and have a stateful component above them in the hierarchy that passes its state to its children via props.*
>
> *React documentation*

- need to carefully consider how to identify and implement this type of component hierarchy

1. Stateless child components
   - *components should be passed data via* `props` *from the parent*
   - *to remain stateless they should not manipulate their* `state`
   - *they should send a callback to the parent informing it of a change, update etc*
   - *arent will then decide whether it should result in a* `state` *change, and a re-rendering of the DOM*
2. Stateful parent component
   - *can exist at any level of the hierarchy*
   - *does not have to be the root component for the app*
   - *instead can exist as a child to other parents*
   - *use parent component to pass* `props` *to its children*
   - *maintain and update state for the applicable components*

React Native - Components

stateful versus presentational

- with React and React Native
  - *compose existing components*
  - *as well as create our own custom components*
- two important concepts and component types in React and React Native
- **stateful**
  - *stateful is a central point in memory*
  - *used to store information about the app or a component's state*
  - *also maintains the ability to modify and update*
- **stateless**
  - *stateless will calculate its internal state*
  - *it should not directly change or mutate this state*
  - *inherent benefit is that we now maintain a clear, transparent record*
  - *given the same inputs, it will always return the same output*

React Native - Components

presentational

- presentational components in a UI
  - *often a reflection of passed or received data*
  - *e.g. a list output of data or some text output for the user to read...*
- React Native UI composed of many smaller blocks
- each block should also be reusable, e.g.

```
class Heading extands Component {
  render() {
    return(
      <View style={styles.headingBox}>
        <Text style={styles.heading}>
          { this.props.text }
        </Text>
      </View>
    )
  }
}
```

- this component may now be reused for headings in the UI
- component itself does not have any state
- simply a *presentational* or *functional* component
- component is a pure function of props passed from its parent
  - *it does not mutate its arguments*

React Native - Components

presentational and functional

- consider such presentational components from their pure functional context
- rewrite our `Heading` component as follows,

```
function Heading(props) {
  return (
    <View style={styles.headingBox}>
      <Text style={styles.heading}>
        { this.props.text }
      </Text>
    </View>
  )
}
```

React JavaScript Library - non-ES6

state - intro - part 4

1. props vs state
   - *in React, we can often consider two types of model data*
   - *includes `props` and `state`*
   - *most components normally take their data from `props`*
   - *allows them to render the required data*
   - *as we work with users, add interactivity, and query and respond to servers*
   - *we also need to consider the `state` of the application*
   - *`state` is very useful and important in React*
   - *also important to try and keep many of our components stateless*
2. state
   - *React considers user interfaces, UIs, as simple state machines*
   - *acting in various states and then rendering as required*
   - *in React, we simply update a component's state*
   - *then render the new corresponding UI*

state - intro - part 5

1. How state works

- if there is a change in data in the application
  - *perhaps due to a server update or user interaction*
  - *quickly and easily inform React by calling `setState(data, callback)`*
- this method allows us to easily merge `data` into `this.state`
  - *re-renders the component*
- as re-rendering is finished
  - *optional `callback` is available and is called by React*
- this `callback` will often be unnecessary
  - *it's still useful to know it is available*

state - intro - part 6

2. In state

- try to keep data in `state` to a minimum
  - *consider minimal possible representation of an application's state*
  - *helps build a stateful component*
- `state` should try to just contain minimal data
  - *data required by a component's event handlers to help trigger a UI update*
  - *if and when they are modified*
- such properties should also normally only be stored in `this.state`
- as we render the updated UI
  - *simply compute required information in the `render()` method based on this `state`*
  - *avoids need to keep computed values in sync in state*
  - *instead relying on React to compute them for us*

3. out of state

- in React, `this.state` should only contain minimal data
- minimum necessary to represent an application's UI state
- should contain
  - *computed value/values*
  - *React components*
  - *duplicated data from `props`*

state - an example app - part I

- a simple app to allow us to test the concept of stateful parent and stateless child components
- resultant app outputs two parallel `div` elements
- allow a user to select one of the available categories
- then view all of the available *authors*

```
//static test data...
var AUTHORS = [
  {id:1, category: 'greek', categoryId:1, author: 'Plato'},
  {id:2, category: 'greek', categoryId:1, author: 'Aristotle'},
  {id:3, category: 'greek', categoryId:1, author: 'Aeschylus'},
  {id:4, category: 'roman', categoryId:2, author: 'Livy'},
  {id:5, category: 'greek', categoryId:1, author: 'Euripides'},
  {id:6, category: 'roman', categoryId:2, author: 'Ptolemy'},
  {id:7, category: 'greek', categoryId:1, author: 'Sophocles'},
  {id:8, category: 'roman', categoryId:2, author: 'Virgil'},
  {id:9, category: 'roman', categoryId:2, author: 'Juvenal'}
];
```

- start with some static data to help populate our app
- `categoryId` used to filter unique categories
  - *again to help get all of our authors per category*

state - an example app - part 2

- for `stateless` child components
  - *need to output a list of filtered, unique categories*
  - *then a list of authors for each selected category*
- first child component is the `CategoryList`
  - *filters and renders our list of unique categories*
  - *`onClick` attribute is included*
  - *state is therefore passed via callback to the `stateful` parent*

state - an example app - part 3

```
//output unique categories from passed data...
var CategoryList = React.createClass({
 render: function() {
  var category = [];
   return (
    <div id="left-titles" className="col-6">
     <ul>
      {this.props.data.map(function(item) {
        if (category.indexOf(item.category) > -1) {
        } else {
         category.push(item.category);
          return (
           <li key={item.id} onClick={this.props.onCategorySelected.bind(null, item.categoryId)}>
            {item.category}
           </li>);
          }}, this)}
      </ul>
     </div>
   );
  }
});
```

- the component is accepting `props` from the parent component
  - *then informing this parent of a required change in state*
  - *change reported via a callback to the `onCategorySelected` method*
  - *does not change `state` itself*
  - *it simply handles the passed data as required for a React app*

React JavaScript Library - non-ES6

state - an example app - part 4

- need to consider our second `stateless` child component
  - *renders the user's chosen authors per category*
  - *user clicks on their chosen category*
  - *a list of applicable authors is output to the right side div*

```
var AuthorList = React.createClass({
 render: function() {
  return (
   <div id="right-titles" className="col-md-6 col-sm-6 col-xs-6">
    <ul>
     {this.props.authors.map(function(item) {
      return (
       <li key={item.id}>{item.author}</li>
       );
      })
     }
    </ul>
   </div>
  );
 }
});
```

- this component does not set any state
- simply rendering the passed `props` data for viewing

state - an example app - part 5

- to handle updates to the DOM, we need to consider our `stateful` parent
- this component passes the app's data as `props` to the children
- handles the setting and updating of the `state` for app as well
- as noted in the React documentation,

> *State should contain data that a component's event handler may change to trigger a UI update.*

- for this example app
  - *only need to store the `selectedCategoryAuthors` in `state`*
  - *enables us to update the UI for our app*

React JavaScript Library - non-ES6

state - an example app - part 6

```
var Container = React.createClass({
    getInitialState: function() {
        return {
        selectedCategoryAuthors: this.getCategoryAuthors(this.props.defaultCategoryId)
        };
    },
  getCategoryAuthors: function(categoryId) {
        var data = this.props.data;
        return data.filter(function(item) {
            return item.categoryId === categoryId;
        });
    },
  render: function() {
    return (
      <div className="container col-md-12 col-sm-12 col-xs-12">
      <CategoryList data={this.props.data} onCategorySelected={this.onCategorySelected} />
      <AuthorList authors={this.state.selectedCategoryAuthors} />
      </div>
    );
  },
  onCategorySelected: function(categoryId) {
    this.setState({
      selectedCategoryAuthors: this.getCategoryAuthors(categoryId)
    });
  }
});
```

state - an example app - part 7

- our `stateful` parent component sets its initial state
  - *including passed data and app's selected category for authors*
- helps set a default state for the app
  - *we can then modify as a user selects their chosen category*
- callback for this user selected category is handled in the `onCategorySelected` method
  - *updates the app's state for the chosen `categoryId`*
  - *then leads to the app re-rendering the DOM for any changes*
- we still have computed data in the app's `state`
  - *as noted in the React documentation,*

> *`this.state` should only contain the minimal amount of data needed to represent your UIs state...*

- we should now move our computations to the `render` method of the parent component
  - *then update `state` accordingly*

state - an example app - part 8

```
var Container = React.createClass({
    getInitialState: function() {
    return {
      selectedCategoryId: this.props.defaultCategoryId
    };
  },
  render: function() {
    var data = this.props.data;
    var selectedCategoryAuthors = data.filter(function(item){
      return item.categoryId === this.state.selectedCategoryId;
    }, this);
    return (
        <div className="container col-md-12 col-sm-12 col-xs-12">
        <CategoryList data={this.props.data} onCategorySelected={this.onCategorySelected} />
        <AuthorList authors={selectedCategoryAuthors} />
        </div>
    );
  },
    onCategorySelected: function(categoryId) {
    this.setState({selectedCategoryId: categoryId});
  }
});
```

- `state` is now solely storing the `categoryId` for our app
- can be modified and the DOM re-rendered correctly

state - an example app - part 9

- we can then load this application
  - *passing data as props to the `Container`*
  - *data from JSON Authors*

```
var buildLibrary = React.render (
 <Container data={AUTHORS} defaultCategoryId='1' />,
 document.getElementById('library')
);
```

- DEMO - state example

React Native - Components

stateful example - part 1

- also create a simple example with React Native components
- start with a standard component structure for a stopwatch

```
class StopWatch extends Component {
  render() {
    return (
      <View>
        <Text>Stopwatch</Text>
      </View>
    )
  }
}
```

stateful example - part 2

- need to define the initial state for this component
- couple of options, including
  - *constructor and class properties*
- e.g. constructor usage,

```
constructor(props) {
  super(props);
  this.state = {
    seconds: 0
  };
}
```

React Native - Components

stateful example - part 3

- also create additional getter methods for other stopwatch values, e.g. minutes.

```
get watchMinutes() {
  return (
    this.state.seconds / 60
  )
}
```

- then reference seconds and minutes in the render function, e.g.

```
render() {
  return (
    <View>
      <Text>Stopwatch: {`${this.watchMinutes} : ${this.state.seconds}`}</Text>
    </View>
  )
}
```

stateful example - part 4

- still need to inform React of a change in state
  - *for each second that passes whilst the stopwatch is active*
- the state is immutable
  - *we can only update it by executing the `setState` function*
- in the component, add the following for a second counter for the stopwatch

```
setInterval(() => {
  this.setState({
    seconds: this.state.seconds + 1
  });
}, 1000);
```

state - minimal state - part 1

- to help make our UI interactive
  - *use React's `state` to trigger changes to the underlying data model of an application*
  - *need to keep a minimal set of mutable state*
- **DRY**, or *don't repeat yourself*
  - *often cited as a good rule of thumb for this minimal set*
- need to decide upon an absolute minimal representation of the `state` of the application
  - *then compute everything else as required*
  - *eg: if we maintain an array of items*
  - *common practice to calculate array length as needed instead of maintaining a counter*

state - minimal state - part 2

- as we develop an application with React
  - *start dividing our data into logical pieces*
  - *then start to consider which is state*
- for example,
  - *is it from `props`?*
  - *if yes, this is probably not `state` in React*
  - *does it update or change over time? (eg: due to API updates etc)*
  - *if yes, this is probably not `state`*
  - *can you compute the data based upon other `state` or `props` in a component?*
  - *if yes, it is not state*
- need to decide upon our minimal set of components that mutate, or *own* state
  - *React is based on the premise of one-way data flow down the hierarchy of components*
  - *can often be quite tricky to determine*
- initially, we can check the following
  - *each component that renders something based on state*
  - *determine the parent component that needs the state in the hierarchy*
  - *a common or parent component should own the state*
    - *NB:* if this can't be determined
    - simply create a basic component to hold this state
    - add component at the top of the state hierarchy

References

- MDN - super
- React
- React Native
- React DevTools
- React Native - Layout Props