Presentation Materials

Introduction To ReactJS

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April 17, 2018

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Topics

- React Overview
- Virtual DOM
- Components
- JSX
- Create React App
- Lifecycle Methods

A JAVASCRIPT LIBRARY FOR BUILDING USER INTERFACES

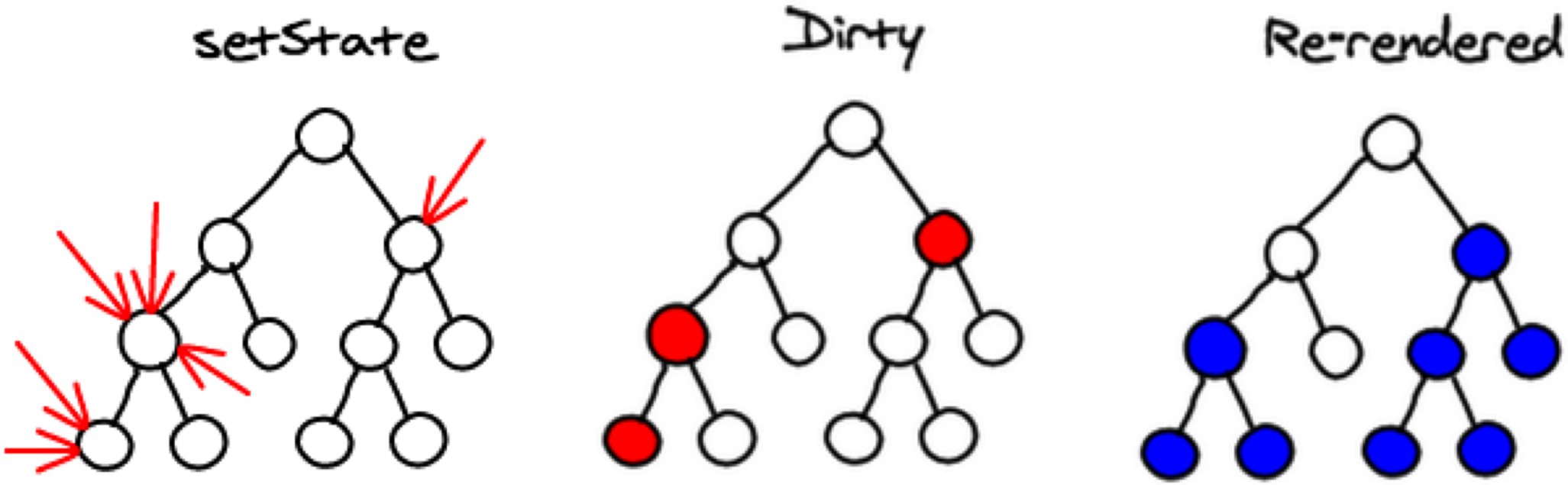
FOCUSES ON THE “VIEW” IN MODEL VIEW CONTROLLER

React Key Concepts

Virtual DOM

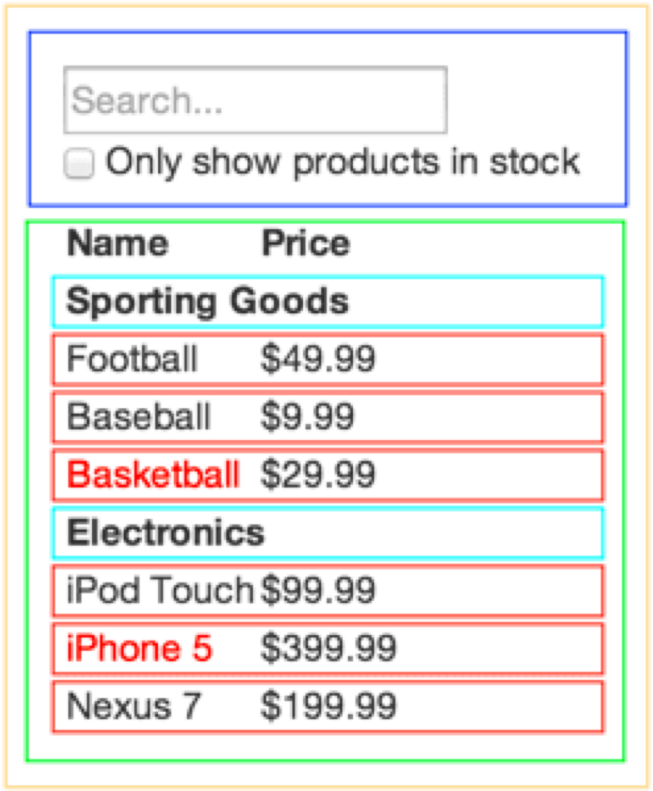
Components

Vanilla JavaScript



Virtual DOM

EVERYTHING IN REACT IS A COMPONENT



1. **`FilterableProductTable` (orange):** contains the entirety of the example
2. **`SearchBar` (blue):** receives all *user input*
3. **`ProductTable` (green):** displays and filters the *data collection* based on *user input*
4. **`ProductCategoryRow` (turquoise):** displays a heading for each *category*
5. **`ProductRow` (red):** displays a row for each *product*

React Components

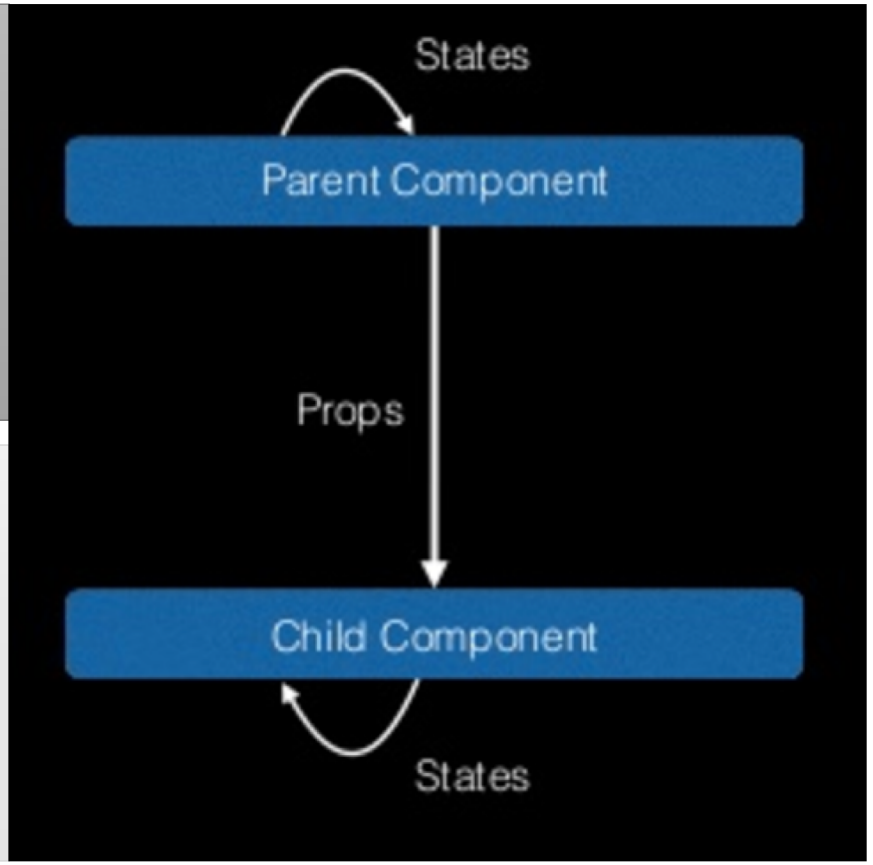
```jsx
import React, { Component, Fragment } from 'react';
import formatDateTime from './utils';

class Demo1a extends Component {
  constructor(props) {
    super(props);

    this.state = {
      date: new Date()
    };
  }

  render() {
    const { date } = this.state;
    const dateTime = formatDateTime(date);

    return (
      <Fragment>
        <h1>DEMO 1a</h1>
        <h2>{dateTime}</h2>
      </Fragment>
    );
  }
}

export default Demo1a;
```

```jsx
import React from 'react';
import PropTypes from 'prop-types';
import formatDateTime from './utils';

const VisualDateTime = props => {
  const { date } = props;
  const dateTime = formatDateTime(date);
  return <h2>{dateTime}</h2>;
};

VisualDateTime.propTypes = {
  date: PropTypes.instanceOf(Date).isRequired
};

export default VisualDateTime;
```

State: Holds information about the component

Props: Information passed from parent component to child component

Data flows down from parent component to child component	Props are read-only (immutable) Props cannot be modified Anything can be passed to children as props (strings, numbers, objects, functions, events)
Events flow up from child component to parent component	States changes can be asynchronous State can be modified using this.setState Through parent passed event handler props



One Way Data Flow

Typechecking with PropTypes

PropTypes ensure your props data is valid

A warning will display in the console if an invalid value was provided for a prop

defaultProps is used to set a default prop value when it is not required

TypeScript or Flow can be used to typecheck source code in your **whole** app

PropTypes / defaultProps Example

```
import React from 'react';
import PropTypes from 'prop-types';

const VisualAnalogClock = props => {
   ...
};

VisualAnalogClock.propTypes = {
  date: PropTypes.instanceOf(Date)
};

VisualAnalogClock.defaultProps = {
  date: new Date()
}

export default VisualAnalogClock;
```

JSX

Syntax extension to JavaScript which expresses the Virtual DOM

Declarative description of the UI inline in JavaScript code

Use inside if statements and for loops, assign to variables, accept as arguments, return from functions

Wrap JavaScript expressions in {} to be used within an element

Preprocessor translates syntax into plain JavaScript objects (Babel)

JSX vs. Create Element Example

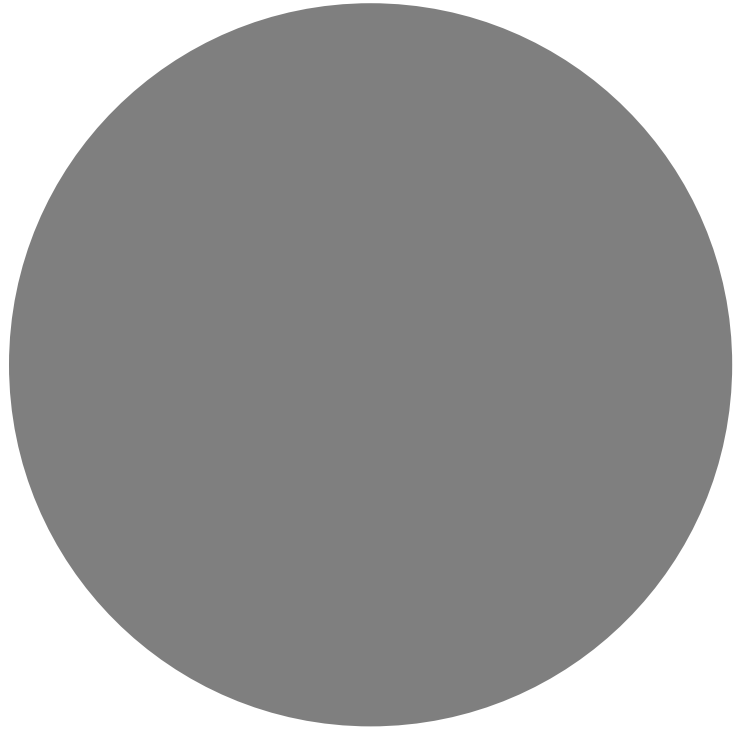
```
class Hello extends React.Component {
  render () {
    return (
      <div className="container">
        <h1>Getting Started</h1>
      </div>
    );
  }
}

ReactDOM.render(<Hello />, mountNode);
```

```
class Hello extends React.Component {
  render () {
    return (
      React.createElement("div",
        { className: "container"},
         React.createElement("h1", null, "Getting Started")
      )
    );
  }
}
ReactDOM.render(React.createElement(Hello, null), mountNode);
```

Create React App

- Create React apps with no build configuration
- Every project built with it has a familiar base, reducing the ramp-up time as you and your teammates switch projects
- Quick start (in Terminal/Console):
  - npm install –g create-react-app
  - create-react-app my-app
  - cd my-app
  - npm start or yarn start
- Uses ES6, Webpack, Babel, and ESLint
- Can be upgraded in-place to get the latest config and tooling
- You can “eject” to a custom setup at any time. No going back.

React Demo #1



Container vs. Presentational Components

- Note: React components do not need to emit DOM
- Container component does data fetching/business logic and renders its corresponding (shares the same name) sub-component
- Benefits:
  - Allow for separation of concerns
  - Allow for reusability of presentational components
  - Allow for better collaboration with designers and other developers

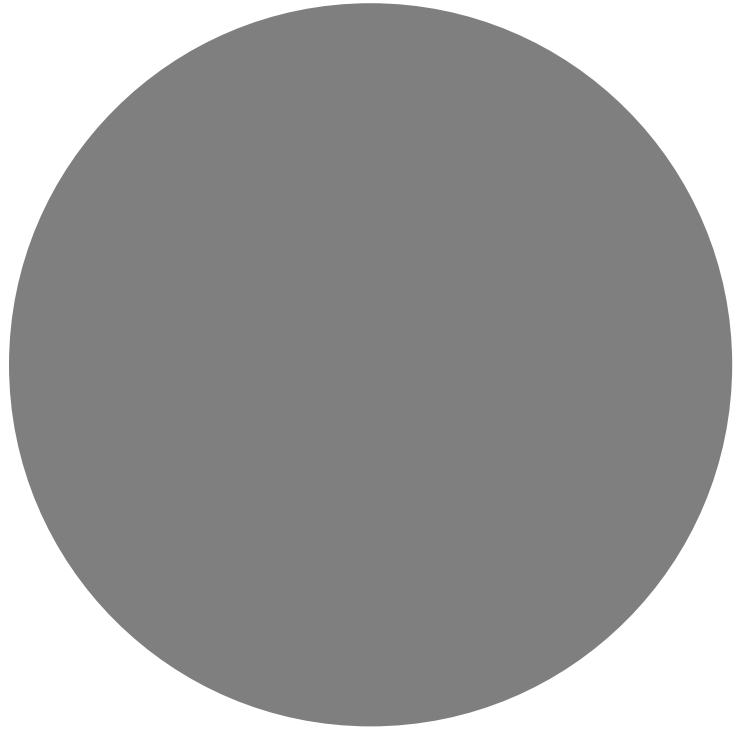
Container vs. Presentational Components

Container Component	Presentational Component
Concerned with how things work	Concerned with how things look
Provide data and behavior to presentational or other container components	Have no dependencies on the rest of the app (e.g. Redux, stores)
Interact with Redux or other state management libraries	Receive data and callbacks only through props
Generally stateful	Only state is UI state (not App state)
Generated using higher order components such as connect() (Redux)	Are generally written as functional components

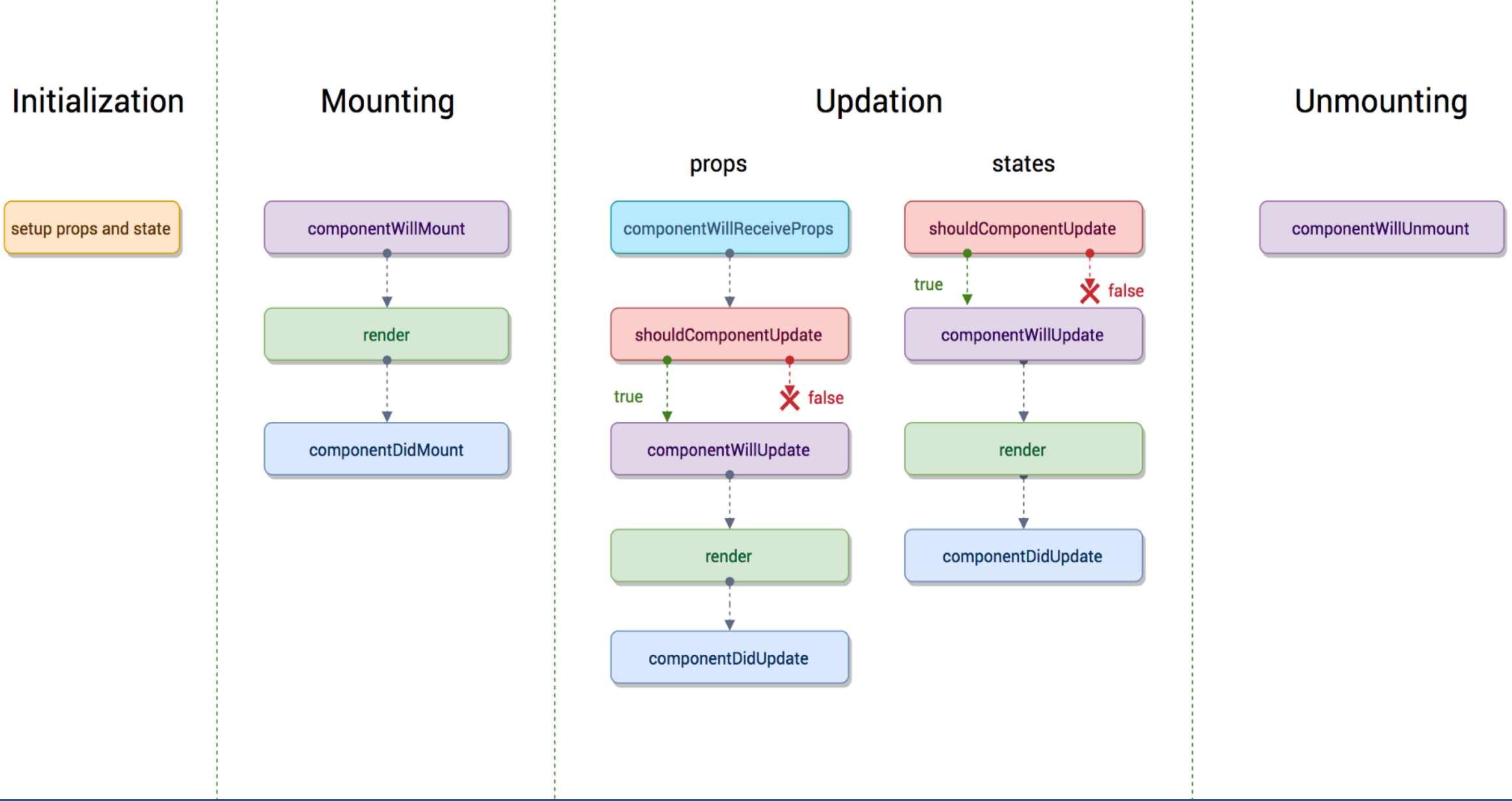
Anti-Pattern

```
// CommentList.js
import React from "react";

class CommentList extends React.Component {
  constructor() {
    super();
    this.state = { comments: [] }
  }

  componentDidMount() {
    fetch("/my-comments.json")
      .then(res => res.json())
      .then(comments => this.setState({ comments }))
  }

  render() {
    return (
      <ul>
        {this.state.comments.map(({ body, author }) =>
          <li>{body}-{author}</li>
        )}
      </ul>
    );
  }
}
```

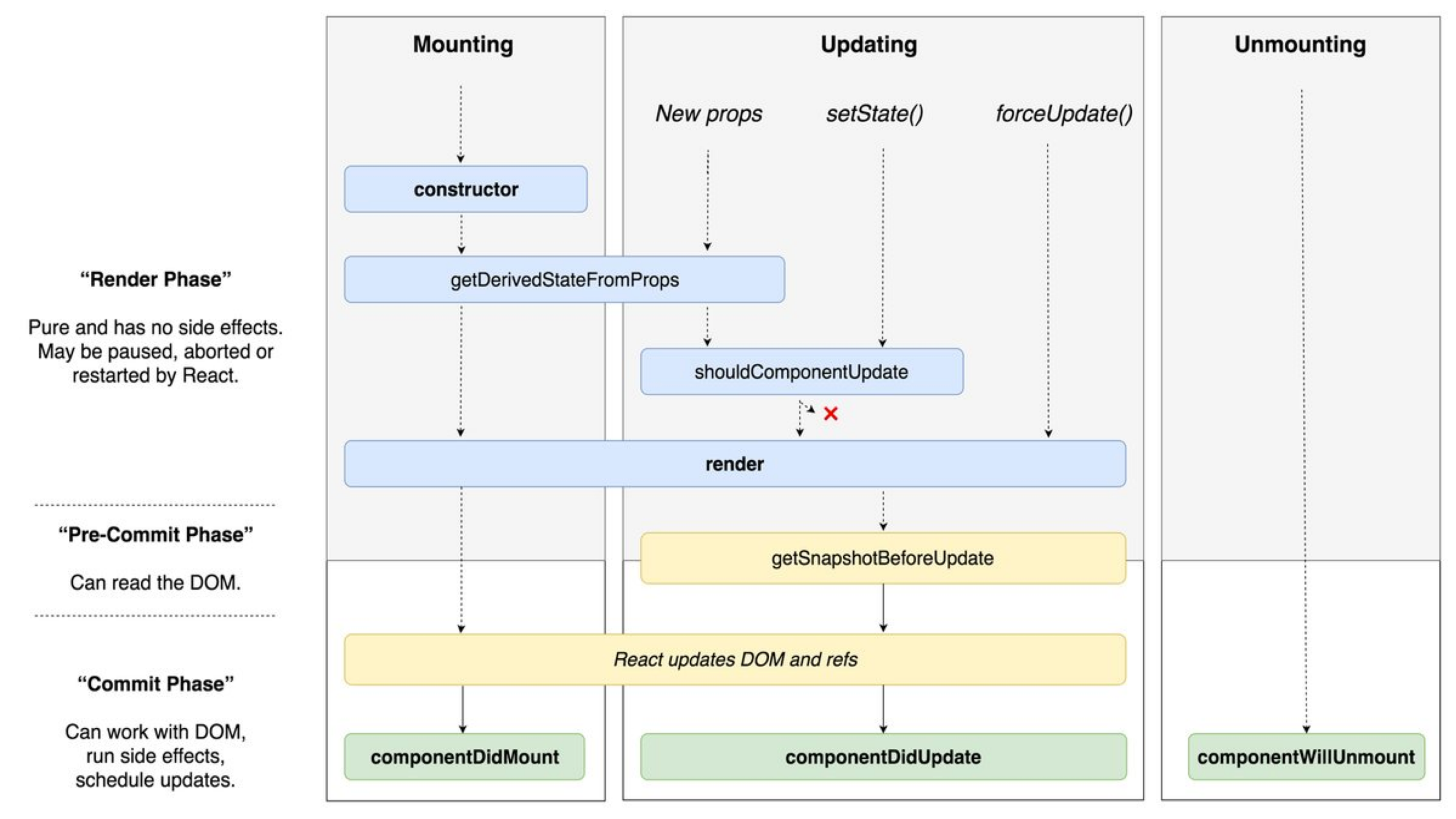
React Demo #2



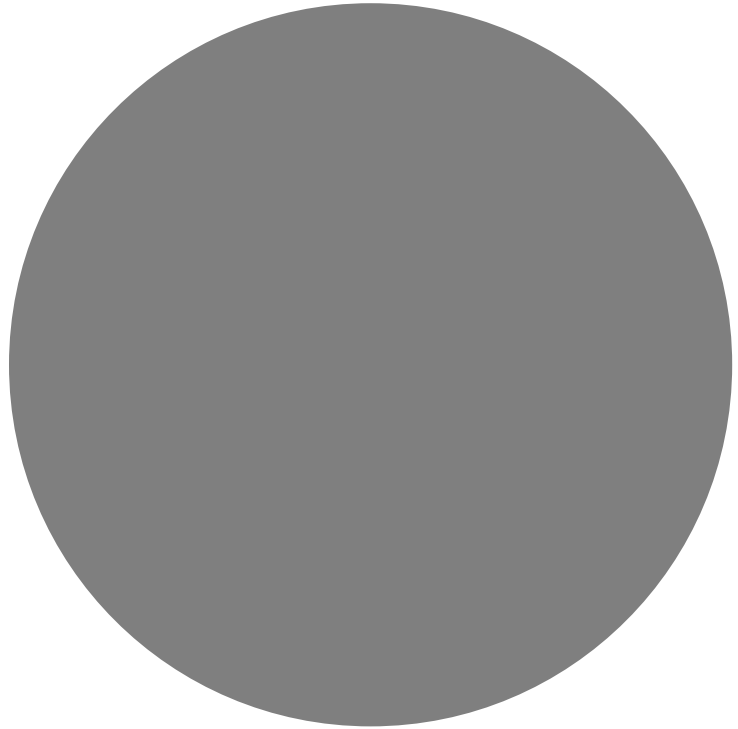
Lifecycle Methods



componentDidCatch(error, info)


Mounting
Updating
Unmounting
New props
setState()
forceUpdate()
constructor
getDerivedStateFromProps
shouldComponentUpdate
render
getSnapshotBeforeUpdate
React updates DOM and refs
componentDidMount
componentDidUpdate
componentWillUnmount
"Render Phase"
Pure and has no side effects. May be paused, aborted or restarted by React.
"Pre-Commit Phase"
Can read the DOM.
"Commit Phase"
Can work with DOM, run side effects, schedule updates.

React Demo #3



Additional things to know…

Lifecycle Methods	ES6 / ES7 / ES8	NodeJS / NPM / Yarn
Babel / Webpack / Parcel	State Management / Redux / Mobx	ESLint / Prettier
StackBlitz / CodeSandbox	CSS-in-JS / styled-components	TypeScript
Flow	Functional Programming	Reactive Programming