

Advanced React Components Workshop

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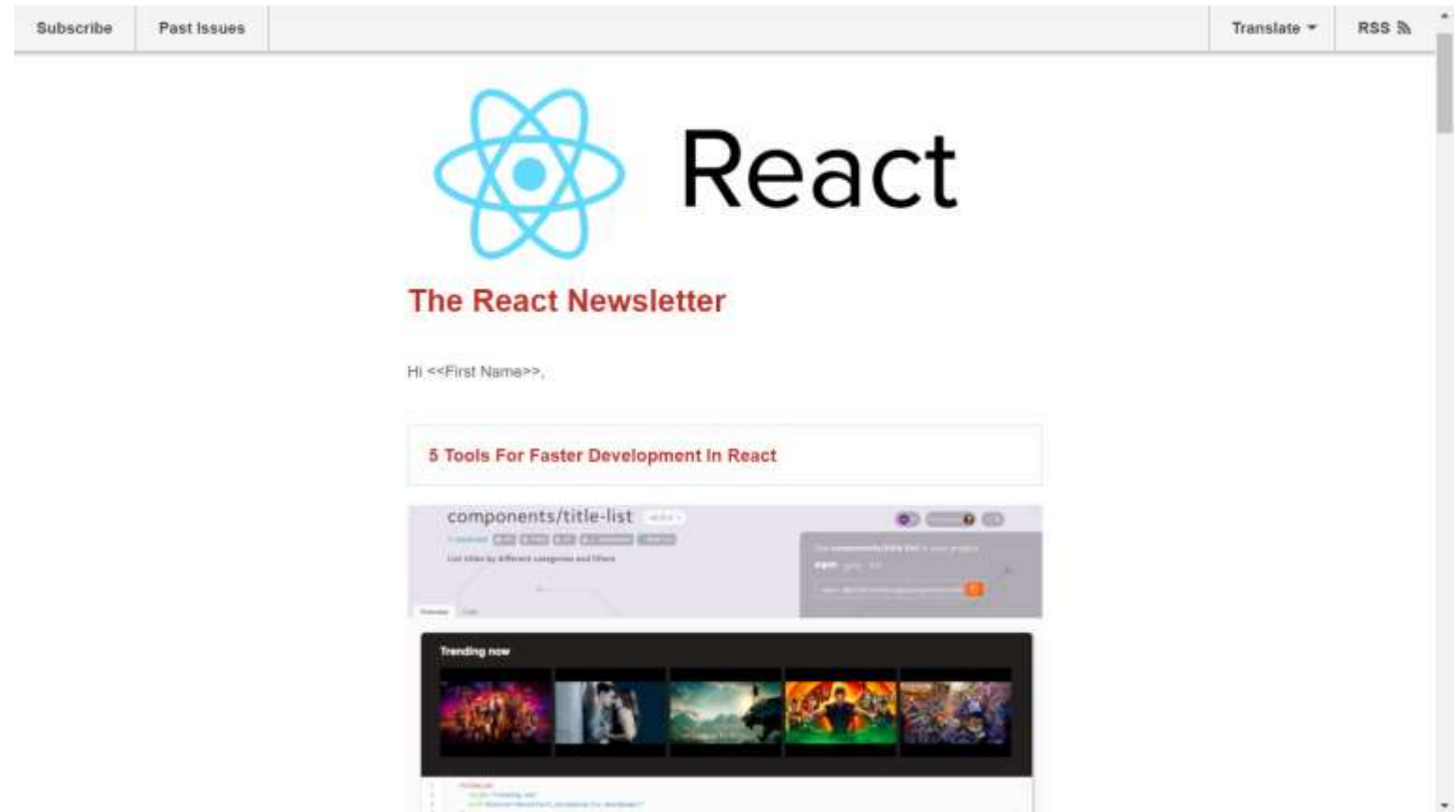


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Skillshare



The React Newsletter



Workshop goal

- Create better React components
- Make them faster and more reliable
- Topics
 1. [Controlled versus Uncontrolled components](#)
 2. [Fragments](#)
 3. [Error Handling](#)
 4. [Higher Order Components versus Render Props](#)
 5. [New Context API](#)
 6. [Profiler API](#)
 7. [PureComponent versus getDerivedStateFromProps\(\)](#)
 8. [Strict mode](#)

Type it out
by hand?

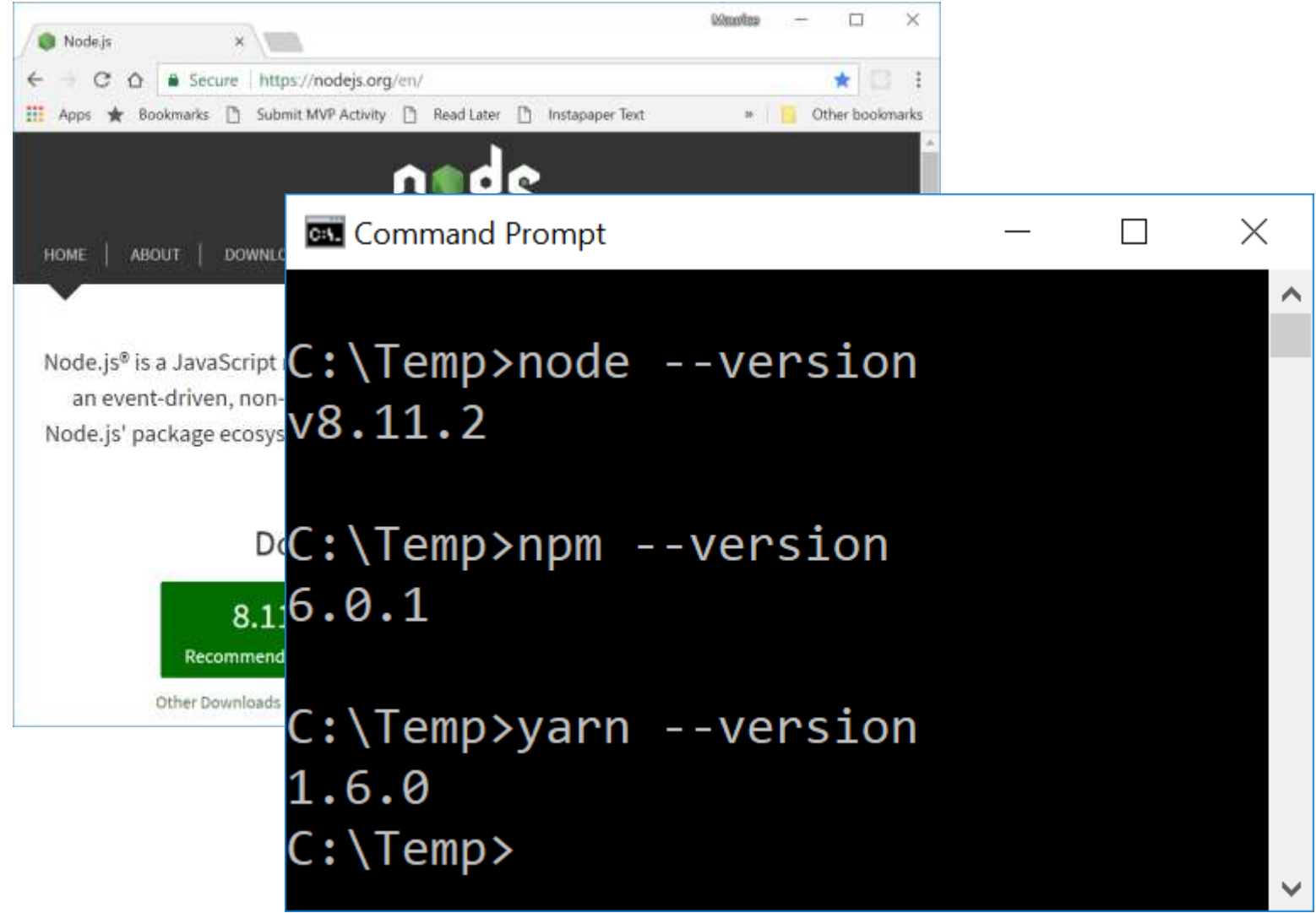
"Typing it drills it into your brain much better than simply copying and pasting it. You're forming new neuron pathways. Those pathways are going to help you in the future. Help them out now!"

Prerequisites

Install Node & NPM

Install the GitHub repository

Install Node.js & NPM



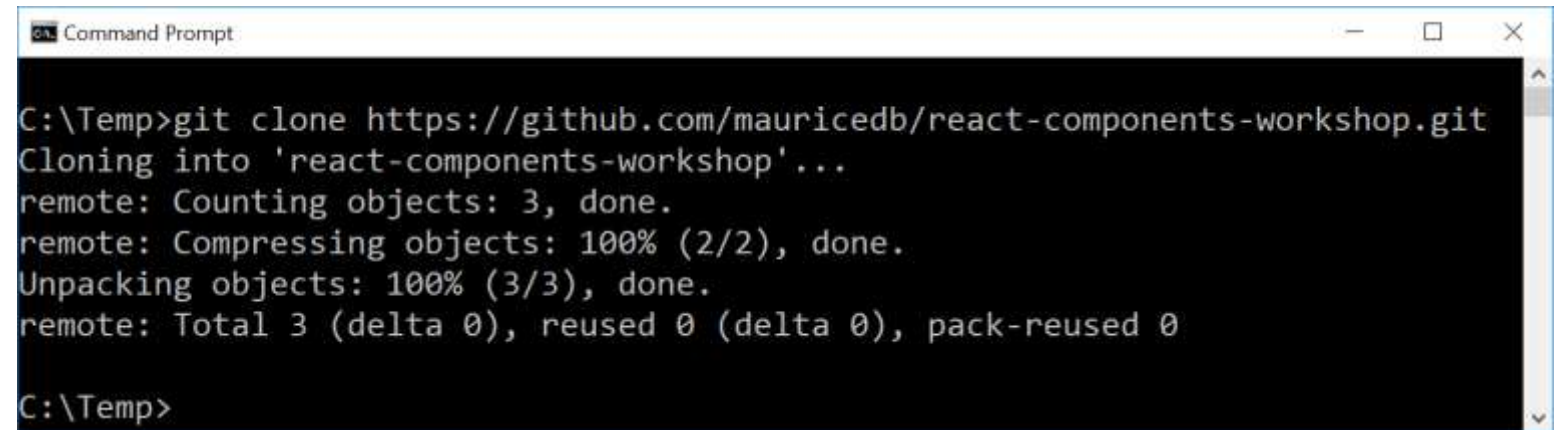
The screenshot displays a web browser window showing the Node.js website (https://nodejs.org/en/) and a Windows Command Prompt window. The Command Prompt window is open over the website, showing the results of three commands executed to verify the installation of Node.js, NPM, and Yarn.

```
C:\Temp>node --version
v8.11.2

C:\Temp>npm --version
6.0.1

C:\Temp>yarn --version
1.6.0
C:\Temp>
```


Clone the GitHub repository

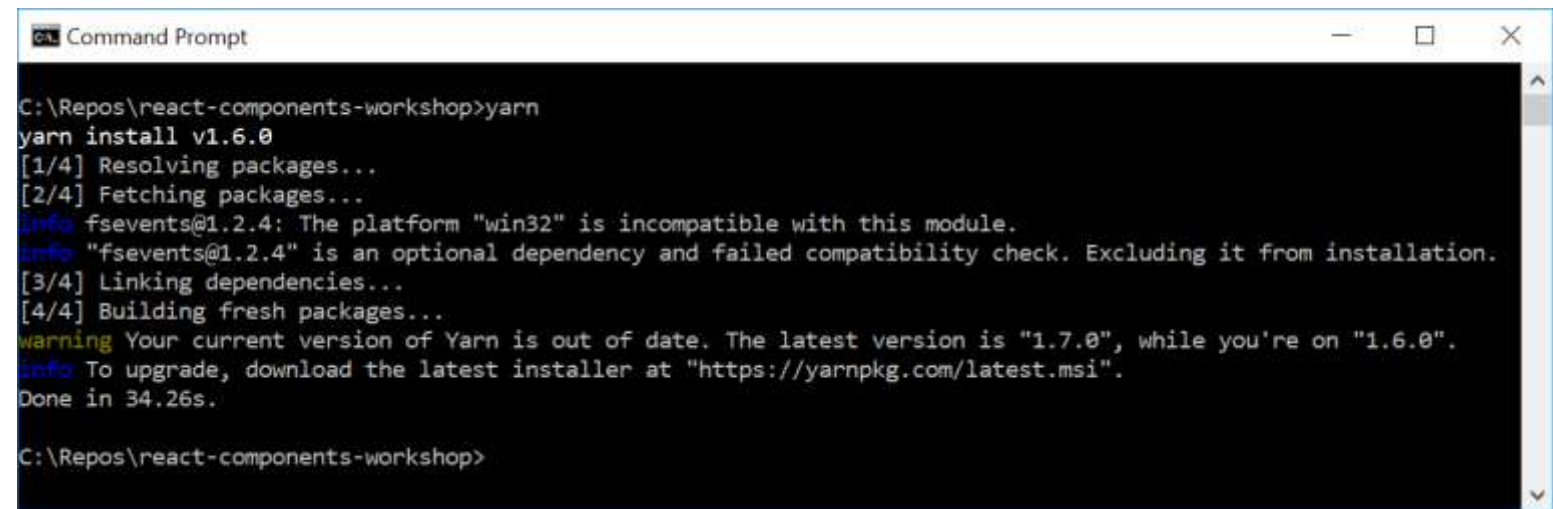


```
Command Prompt

C:\Temp>git clone https://github.com/mauricedb/react-components-workshop.git
Cloning into 'react-components-workshop'...
remote: Counting objects: 3, done.
remote: Compressing objects: 100% (2/2), done.
Unpacking objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0

C:\Temp>
```

Install NPM packages

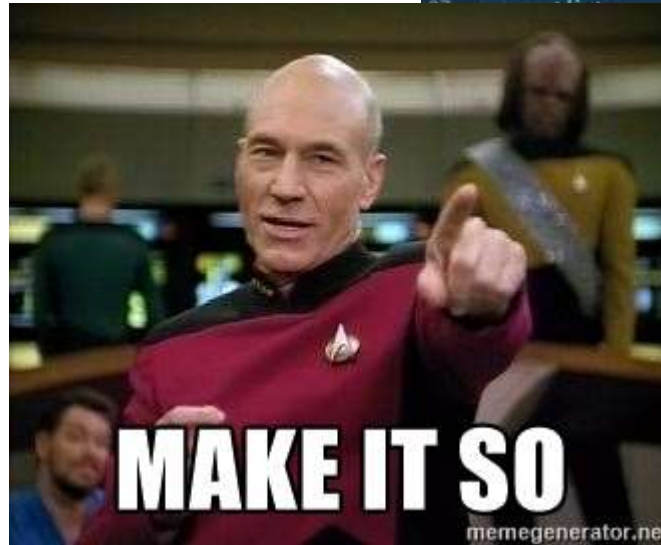


```
Command Prompt

C:\Repos\react-components-workshop>yarn
yarn install v1.6.0
[1/4] Resolving packages...
[2/4] Fetching packages...
info fsevents@1.2.4: The platform "win32" is incompatible with this module.
info "fsevents@1.2.4" is an optional dependency and failed compatibility check. Excluding it from installation.
[3/4] Linking dependencies...
[4/4] Building fresh packages...
warning Your current version of Yarn is out of date. The latest version is "1.7.0", while you're on "1.6.0".
info To upgrade, download the latest installer at "https://yarnpkg.com/latest.msi".
Done in 34.26s.

C:\Repos\react-components-workshop>
```

Following along



```
22 class App extends Component {
23   static displayName = 'App';
24
25   render() {
26     return (
27
28       <div
29         className="mdl-grid">
30         <div
31           className="mdl-cell mdl-cell--12-col App-header">
32           <img
33             src={logo} className="App-logo" alt="logo" />
34           <h1
35             className="App-title">Welcome to React</h1>
36         </div>
37
38         <div
39           className="mdl-grid">
40           <div
41             className="mdl-cell mdl-cell--8-col mdl-cell--2-offset">
42
43             </div>
44         </div>
45       </div>
46     );
47   }
48 }
```

- Repo: <http://bit.ly/rcw-repo>
- Slides: <http://bit.ly/rcw-slides>



Why write better component?



Why?

“A React application is a component tree”

Best practices

- Keep components **small and focused**
- **One component** per file
- Use Prettier for **formatting**
- Use StoryBook to UI test components in **isolation**
- Use Functional Component whenever possible
- Add a **displayName** to each component

Best practices

- Use **ECMAScript 2018** syntax
 - Fat arrow
 - Class properties
 - Object destructuring
 - Spread operator
- Use **type checking**
 - Use propTypes and defaultProps
 - TypeScript or Flow
- Add **unit tests**

Controlled/Uncontrolled components

Uncontrolled input

```
1  import React from 'react';
2
3  const LabeledInput = ({ value, name, label, errorMessage, ...props }) => (
4    <div className="mdl-textfield mdl-js-textfield mdl-textfield--floating-label">
5      <input
6        className="mdl-textfield__input"
7        type="text"
8        id={name}
9        name={name}
10       defaultValue={value}
11       {...props}
12     />
13     <label className="mdl-textfield__label" htmlFor={name}>
14       {label}
15     </label>
16     {errorMessage && (
17       <span className="mdl-textfield__error">{errorMessage}</span>
18     )}
19   </div>
20 );
```

Controlled input

```
1  import React from 'react';
2
3  const LabeledInput = ({
4    value,
5    name,
6    label,
7    errorMessage,
8    onChange,
9    ...props
10 }) => (
11   <div className="mdl-textfield mdl-js-textfield mdl-textfield--floating-label">
12     <input
13       className="mdl-textfield__input"
14       type="text"
15       id={name}
16       name={name}
17       value={value}
18       onChange={e => onChange(name, e.target.value)}
19       {...props}
20     />
21     <label className="mdl-textfield__label" htmlFor={name}>
22       {label}
23     </label>
24     {errorMessage && (
25       <span className="mdl-textfield__error">{errorMessage}</span>
26     )}
27   </div>
28 );
```

Uncontrolled form

```
17   onFormSubmit = e => {
18     e.preventDefault();
19
20     const newMovie = {
21       title: e.target.title.value,
22       director: e.target.director.value,
23       overview: e.target.overview.value
24     };
25
26     alert(JSON.stringify(newMovie, null, 2));
27   };
28
29   render() {
30     const { movie, valid } = this.state;
31
32     return (
33       <div>
34         <h2>Controlled & Uncontrolled components</h2>
35         <form onSubmit={this.onFormSubmit} noValidate>
36           <LabeledInput
37             value={movie.title}
38             name="title"
39             label="Title"
40             required
41             errorMessage="Please enter a title!"
42           />
```

Controlled form

```
17   updateMovie = (name, value) => {
18     const movie = { ...this.state.movie, [name]: value };
19     const valid = !!movie.title && !!movie.director;
20
21     this.setState({ movie, valid });
22   };
23
24   onFormSubmit = e => {
25     e.preventDefault();
26     alert(JSON.stringify(this.state.movie, null, 2));
27   };
28
29   render() {
30     const { movie, valid } = this.state;
31
32     return (
33       <div>
34         <h2>Controlled & Uncontrolled components</h2>
35         <form onSubmit={this.onFormSubmit} noValidate>
36           <LabeledInput
37             value={movie.title}
38             name="title"
39             label="Title"
40             required
41             errorMessage="Please enter a title!"
42             onChange={this.updateMovie}
43           />
```



- **Both can be appropriate** in different circumstances
- **Combine** both approaches:
 - How “Controllable” React components maximize reusability



useFromProps()



Fragments

New in React 16.0

Using a <Fragment>

```
1  import React, { Fragment } from 'react';
2
3  const Content = () => (
4    <Fragment>
5      <p className="content">
6        Lorem ipsum dolor sit amet, consectetur adipiscing elit. Vestibulum urna
7        tortor, mollis et turpis ac, convallis imperdiet nulla.
8      </p>
9
10
11     <p className="content">
12       In elementum elementum velit blandit luctus. Curabitur vehicula
13       pellentesque odio. Integer gravida imperdiet odio, eget commodo ipsum
14       rutrum in.
15     </p>
16   </Fragment>
17 );
```




- Use the **shorthand <> syntax** in TypeScript
 - When you don't need to specify any attributes
 - Will be supported by Pabel in the future



Error Handling

New in React 16.0

Defining an error boundary

```
You, 3 days ago | 1 author (You)
5  class ErrorBoundary extends Component {
6    static displayName = 'ErrorBoundary';
7
8    state = {
9      error: null,
10     errorInfo: null
11   };
12
13   componentDidCatch(error, errorInfo) {
14     this.setState({ error, errorInfo });
15   }
16
17   render() {
18     const { children } = this.props;
19     const { error, errorInfo } = this.state;
20
21     if (error) {
22       return <ErrorCard error={error} errorInfo={errorInfo} />;
23     }
24
25     return children;
26   }
27 }
```

Using an error boundary

```
6  class ErrorsDemo extends Component {  
7      static displayName = 'ErrorsDemo';  
8  
9      render() {  
10         return (  
11             <div>  
12                 <h2>Error Handling</h2>  
13                 <ErrorBoundary>  
14                     <ErrorsForm />  
15                 </ErrorBoundary>  
16             </div>  
17         );  
18     }  
19 }
```



- The componentDidCatch() is **only for React lifecycle functions** in child components
 - Errors in event handlers, async code etc. are **not caught**



on a server and periodically check



Higher Order Components

Defining a HOC

```
1  import React, { Component } from 'react';
2
3  const withTimeHOC = TheComponent => {
4    return class extends Component {
5      state = { now: new Date() };
6
7      componentDidMount() {
8        this.handle = setInterval(() => this.setState({ now: new Date() }), 1000);
9      }
10
11     componentWillUnmount() {
12       clearInterval(this.handle);
13     }
14
15     render() {
16       const { now } = this.state;
17       const { now } = this.state;
18
19       return <TheComponent now={now} />;
20     }
21   };
22 };
```

Using a HOC

```
3 import SimpleClock from '../components/SimpleClock';  
4 import AnalogClock from '../components/AnalogClock';  
5 import withTimeHOC from './withTimeHOC';  
6
```

```
    renderTime = withTimeHOC(SimpleClock);  
    renderTime = withTimeHOC(AnalogClock);
```





Render Props

Defining a Render Prop

```
1  import React, { Component } from 'react';
2
   You, 4 days ago | 1 author (You)
3  class WithTimeRP extends Component {
4    state = { now: new Date() };
5
6    componentDidMount() {
7      this.handle = setInterval(() => this.setState({ now: new Date() }), 1000);
8    }
9
10   componentWillUnmount() {
11     clearInterval(this.handle);
12   }
13   render() {
14     const { children } = this.props;
15     const { now } = this.state;
16
17     return children(now);
18   }
19 }
```

Using a Render Prop

```
48 <WithTimeRP>
49   {now => (
50     <div className="mdl-cell mdl-cell--4-col">
51       <SimpleClock now={now} />
52       <AnalogClock time={now} />
53     </div>
54   )}
55 </WithTimeRP>
```



- Higher Order Functions are **easy to use**
 - Complexity is for developer of HOC
- Render Props are **more flexible**

...ing developer



New Context API

New in React 16.3

Creating the context

```
1  import React, { Component, createContext } from 'react';
2
3  const TimeContext = createContext();
4
5  export const TimeContextConsumer = TimeContext.Consumer;
6
7  export class TimeContextProvider extends Component {
8    state = { now: new Date() };
9
10   componentDidMount() {
11     this.handle = setInterval(() => this.setState({ now: new Date() }), 1000);
12   }
13
14   componentWillUnmount() {
15     clearInterval(this.handle);
16   }
17   render() {
18     const { children } = this.props;
19     const { now } = this.state;
20
21     return <TimeContext.Provider value={now}>{children}</TimeContext.Provider>;
22   }
23 }
```

Using the context

```
6 import { TimeContextProvider, TimeContextConsumer } from './TimeContext';
7
8 class ErrorsDemo extends Component {
9   render() {
10    return (
11      <div>
12        <TimeContextProvider>
13          <h2>Context API</h2>
14          <div className="mdl-grid">
15            <div className="mdl-cell mdl-cell--2-col" />
16            <div className="mdl-cell mdl-cell--4-col">
17              <TimeContextConsumer>{now => <SimpleClock now={now} />}</TimeContextConsumer>
18            </div>
19            <div className="mdl-cell mdl-cell--4-col">
20              <TimeContextConsumer>{now => <AnalogClock time={now} />}</TimeContextConsumer>
21            </div>
22          </div>
23        </TimeContextProvider>
24      </div>
25    );
26  }
27 }
```



- The context can contain **both data and functions**
- Make sure you don't create a new context object every render



React Profiler

New in React 16.4

Experimental!

Profiler component

```
1  import React, { Component, unstable_Profiler as Profiler } from 'react';
2
3  class MyProfiler extends Component {
4    static defaultProps = {
5      id: 'profile'
6    };
7
8    onRender = (id, phase, actualTime) => console.log(id, phase, actualTime);
9
10   render() {
11     const { children, id } = this.props;
12
13     return (
14       <Profiler id={id} onRender={this.onRender}>
15         {children}
16       </Profiler>
17     );
18   }
19 }
```

Profiling child components

```
17   render() {
18     const { firstName, primeCount } = this.state;
19
20     return (
21       <MyProfiler>
22         <div>
23           <h2>Profiler</h2>
24
25           <div>
26             <MyProfiler id="inputs">
27               <LabeledInput
28                 label="Max Prime:"
29                 value={primeCount}
30                 type="number"
31                 name="primeCount"
32                 onChange={this.onChange}
33               />
34             </MyProfiler>
35             <MyProfiler id="primes">
36               <Primes primeCount={primeCount} />
37             </MyProfiler>
38           </div>
39         </div>
40       </MyProfiler>
41     );
42   }
43 }
```



- Provides timing information on **each update**
 - As well as the initial mount
- Profiler components can be **nested** as required
 - All child components



Pure Component

Benefits

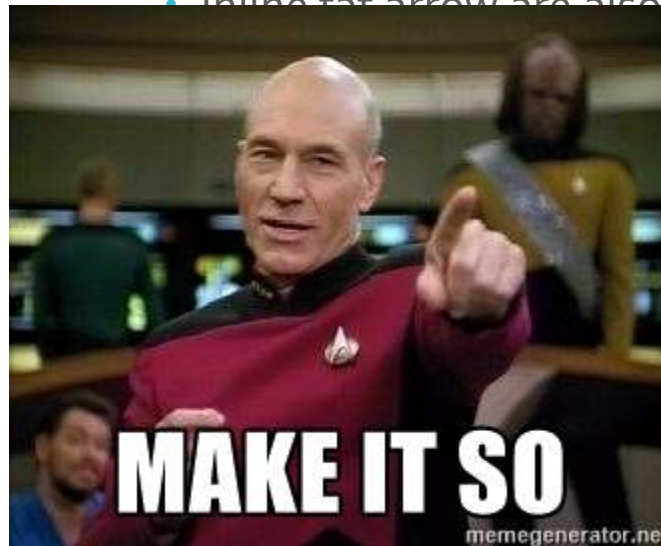
- Normal components **render every time the parent renders**
 - Even if props have not changed
- A PureComponent **only renders when the input props change**
 - Or it's own state is updated

PureComponent

```
1 import React, { PureComponent } from 'react';
2
3 class Primes extends PureComponent {
4   calculatePrimes() {
5     const primes = [];
6     // Calculating primes
7     return primes;
8   }
9   render() {
10    const { primeCount } = this.props;
11    const primes = this.calculatePrimes();
12
13    return (
14      <div>
15        <h3>Primes</h3>
16        {primes.join(', ')}
17      </div>
18    );
19  }
20 }
21
22 export default Primes;
```



- **All props are checked**, including children using ===
 - JSX children are always new objects
 - Inline fat arrow are also always new objects



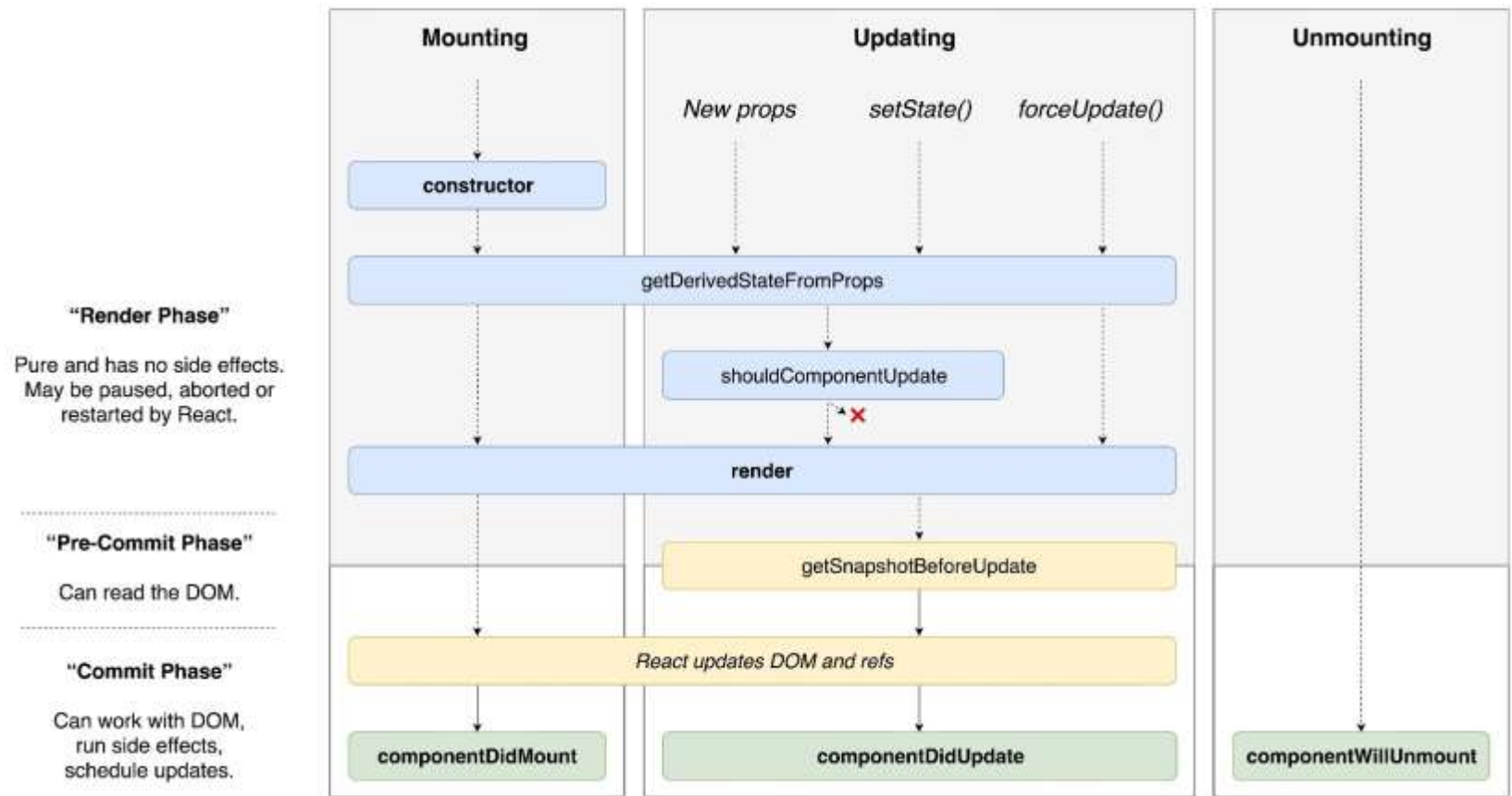
getDerivedStateFromProps

New in React 16.3

getDerivedStateFromProps

- Executed **before each render** call
 - Regardless of the reason of re-rendering
- It's a **static** function
 - No this reference or side effects allowed
- **Return an object** to be merged with the state
 - Or null if no changes are needed

React lifecycle methods



<http://projects.wojtekmaj.pl/react-lifecycle-methods-diagram/>

Derived state

```
4 class Primes extends Component {
5   state = { primeCount: 0, primes: [] };
6
7   static getDerivedStateFromProps(props, state) {
8     if (props.primeCount !== state.primeCount) {
9       const { primeCount } = props;
10      const primes = calculatePrimes(primeCount);
11
12      return { primeCount, primes };
13    }
14
15    return null;
16  }
17
18  render() {
19    const { primes } = this.state;
20
21    return (
22      <div>
23        <h3>Primes</h3>
24        {primes.join(', ')}
25      </div>
26    );
27  }
28 }
```

Beware



Dan Abramov

@dan_abramov

Following



The takeaway here is: trying to “sync” state to props is rarely a good idea. There are legit use cases for `getDerivedStateFromProps()` but if it feels ugly, it’s because you likely don’t need it. It exposes how error-prone your logic really was all along.

5:07 PM - 27 May 2018

5 Retweets 50 Likes



2



5

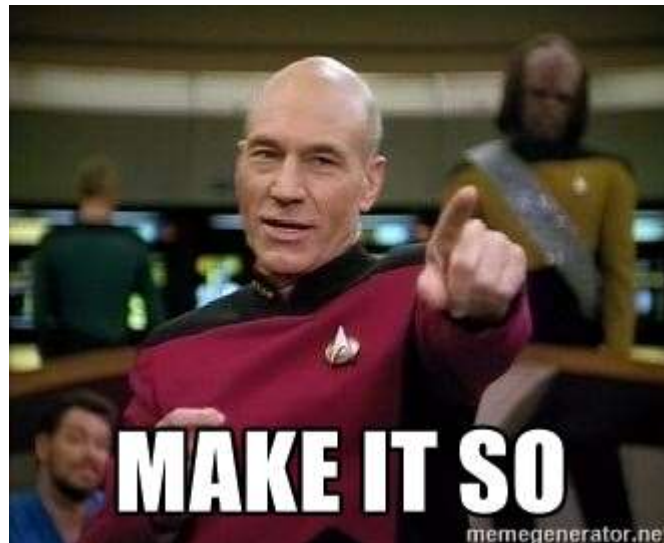


50





- A very **flexible** way to prevent recalculation of values
 - Often a better approach than PureComponent
 - But can be combined if required



en as an **anti-pattern**
eeded

Strict Mode

New in React 16.3

Strict Mode

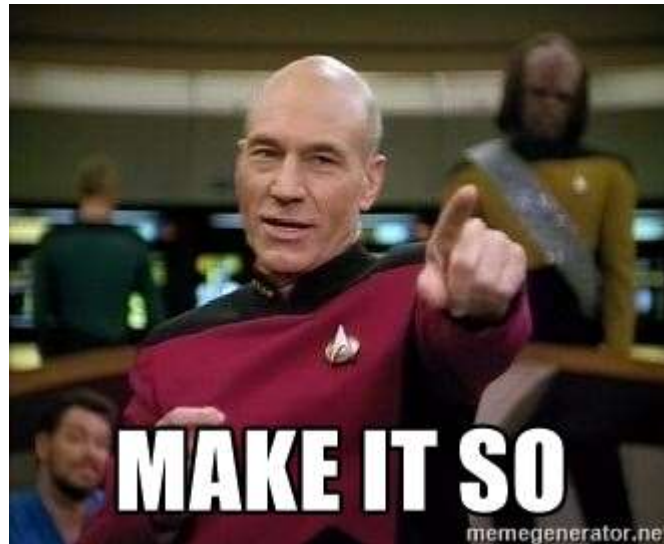
- Warns about potentially problematic code
 - Usage of deprecated lifecycle function
 - Usage of string refs
- Tries to detect side effects by calling some lifecycle methods twice

Enabling Strict mode

```
5  class StrictModeDemo extends Component {  
6      render() {  
7          return (  
8              <div>  
9                  <h2>Strict mode</h2>  
10  
11                  <StrictMode>  
12                      <Greeting name="Maurice" />  
13                  </StrictMode>  
14              </div>  
15          );  
16      }  
17 }
```



- Wrap just a part of the component tree in a StrictMode
 - Makes it easier to migrate in steps



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