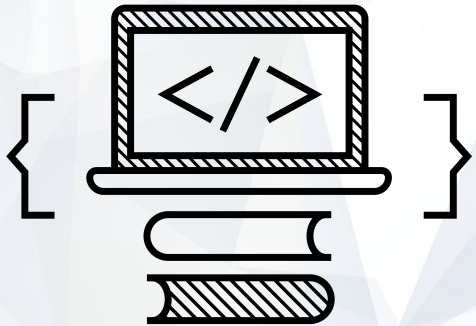
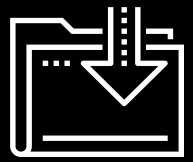


Introduction to React Hooks

Skills Bootcamp in Front-End Web Development

Lesson 14.1




WELCOME

Learning Objectives

By the end of class, you will be able to:

Articulate the term “effect” in the broader sense of programming.

Utilize React’s most common built-in Hooks: `useState` and `useEffect`.

Transform a React application that manages state with a class component into an application that uses functional components with React Hooks.

Create a custom reusable Hook that follows the two rules of Hooks.

State and Hooks

React State Management

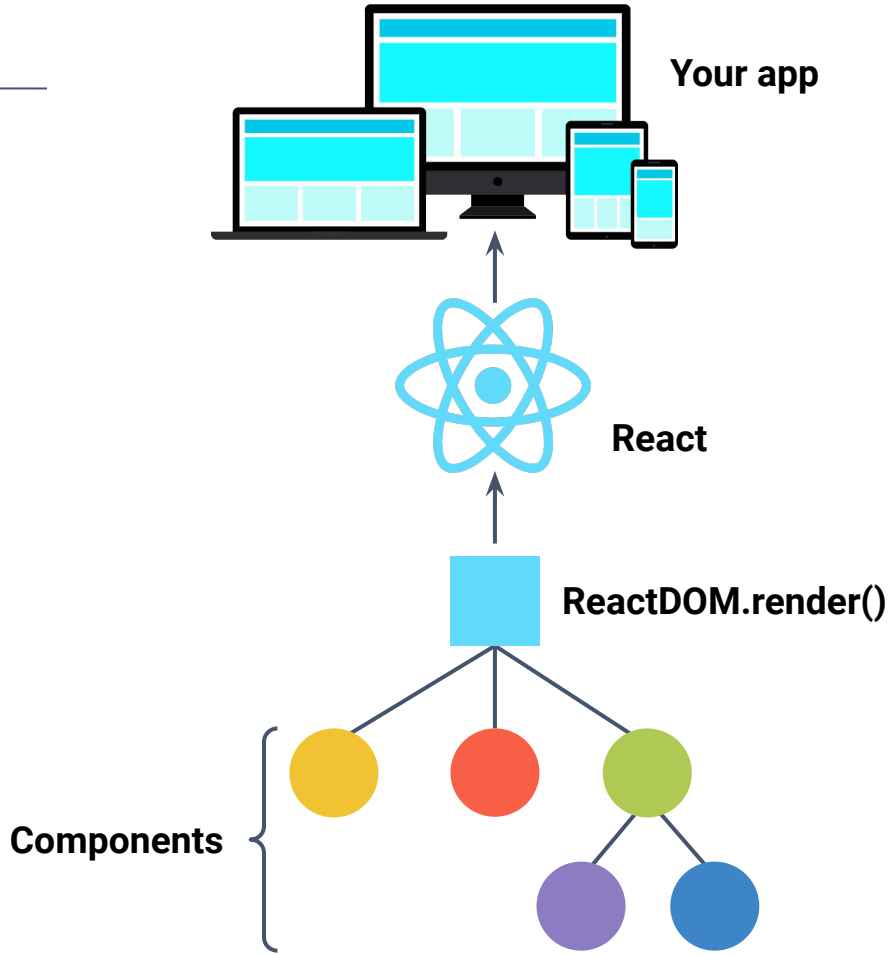
A component’s **“state”** is a property defined on a class component instance used for storing values that we want to associate with it.

A Component's "State"

This property is recognized by React and can be used to embed data inside of a component's UI, which we want to update over time.

Whenever a component's state is updated, its render method is fired along with the render methods of all of its children.

This updates the application's UI to display the new data without having to refresh the browser.



React State Management

React State Management

Most software bugs are the result of bad state. More accurately, they're the result of bad assumptions about state. We assume that some bit of data could never happen or that some sequence of state changes is impossible.

Then we write code with those assumptions baked in.

Even if our code is perfect, troubles can arise.

If our code isn't the only code managing state, another process or step can modify state into something that our code didn't anticipate.

That's a bug.

React State Management

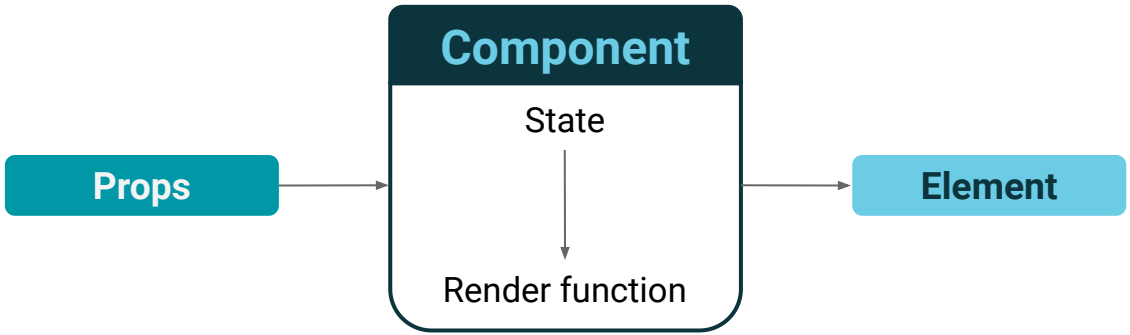
React state management protects us from a lot of that.

Science hasn’t figured out how to create truly bug-free code, but React state management gets us a little closer.

React's State Flow

At its core, React is conceptually simple.

- Component instances track their own private state.
- Components may cautiously share their state with a child via props.
- Any change to state (and by proxy, props) triggers a re-render.



React's State Flow

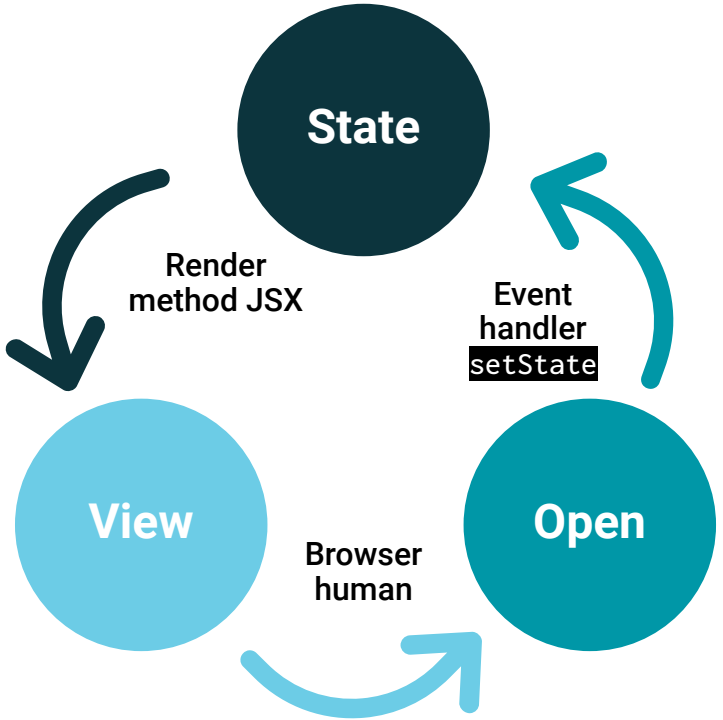
This happens over and over in the following process:

01 State drives UI rendering. React reacts to state.

02 Events modify state.

03 Return to Step 1.

But the devil is in the details.



Managing state can be difficult because there is no one-size-fits-all solution.

But there is another way.

Comparing Ways to Manage State

	Class Components with `setState()`	Functional Components with `useState()`
Advantages 	Component and children will re-render with up-to-date data.	• It's easier to read and debug, and there's no need to use `this`. • You have access to Hooks.
Disadvantages 	• Updating state from nested components can be difficult. • Since state only flows one way, all components that need access to the state must be children of the same stateful component.	• Needs to use other Hooks to manage complex levels of state. • Not supported by older codebases, which will still need to use class components for state.

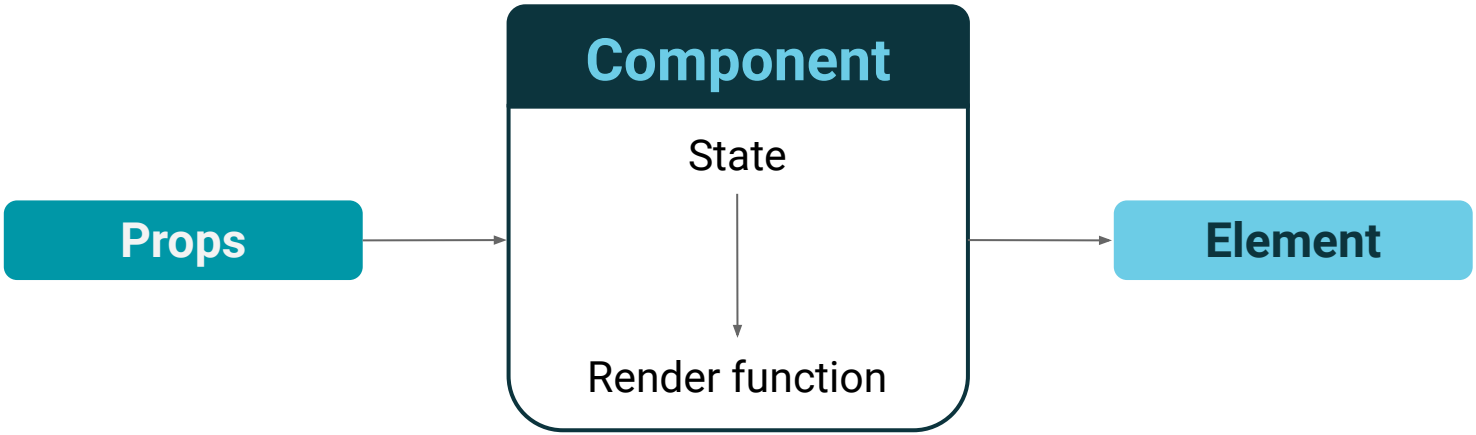
Sharing State

Component design and class design are the same thing but in a different layer of the application.

Sharing State

Like Java classes, components need a way to share messages, which is just a different way of saying that components need a way to share changes in state.

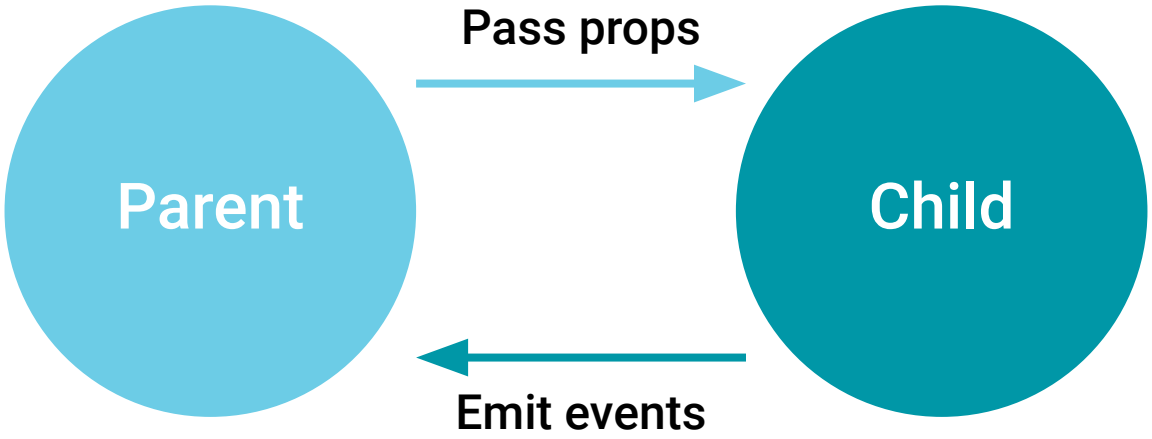
We've already seen an example of parent-to-child state sharing through props.



Children communicate with their parent via events.

Sharing State

When components communicate in both directions, they can solve interesting problems.



Discuss amongst yourselves:

How have you managed React state so far?

What is one of the biggest issues of sharing state between class and functional components?

Class Components vs. Functional Components

Class Components vs. Functional Components

Class components paired with the `setState` method is the most common way to manage state.

Benefits

- Setting state will force the component to re-render.
- This ensures that the component and all of its children will be up to date with the latest state.

Drawbacks

- Since state only flows in one direction, all components that need to use the state must be children of the stateful component.
- Updating state from deep within the component hierarchy is often difficult.
- You are forced to use the keyword `this` and use a class component.

Class Components vs Functional Components

The `useState` Hook is another tool that can be used to manage state through functional components.

Benefits

- There's no need to receive state from props as a child component.
- It's easier to read and debug due to less code.
- There is no need to use `this`.
- You have access to "Hook."

Drawbacks

- Will need to use other "Hooks" to manage complex levels of state.
- As of React 16.8, Facebook recommends using functional components whenever possible.

React Hooks

Hooks are functions that let you “hook into” React state and lifecycle features from functional components.

React has no plans to deprecate class components, but Hooks can do everything a class component can do and more.

React Hooks

In this lesson, we will cover two Hooks:

`useState`

Allows you to use state in a functional component.

`useEffect`

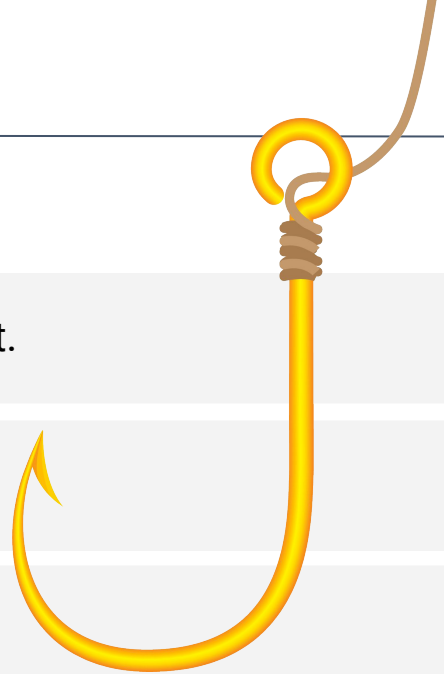
Replaces lifecycle methods like `componentDidMount` and `componentDidUpdate`.

An **effect**, also commonly referred to as a *side effect*, is a term used to describe the result of affecting the “outside world.”

React Hooks

This includes, but is not limited to:

React Hooks



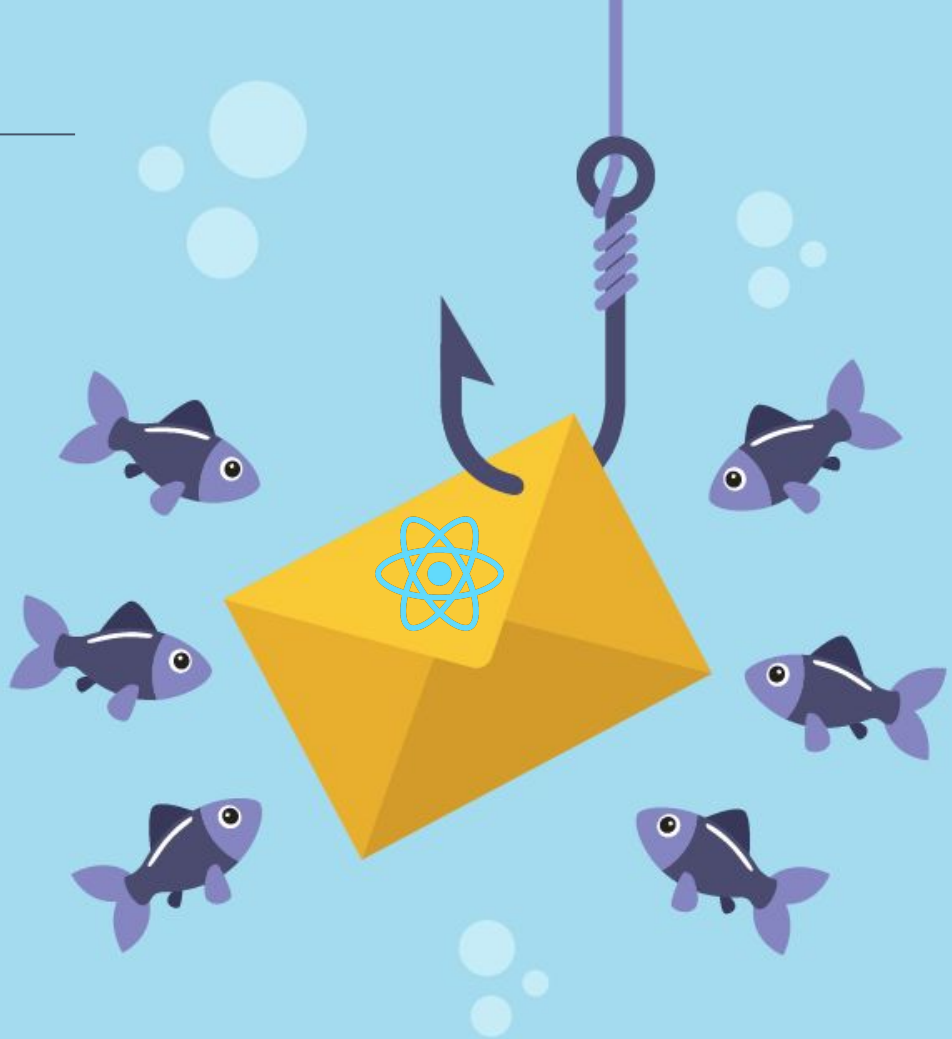
- Functional components use **Hooks** for state management.
- A Hook is a function.
- Hook names always start with the `use` prefix.
- Hooks allow us to tap into larger React plumbing. We “hook into” a React process.
- The `useState` Hook manages state.

React Hooks

We will be covering the built-in Hooks `useState` and `useEffect`, but there are many more Hooks.

The strong developer community around React has created a plethora of different custom Hooks that you can plug into your applications.

This makes it so that all stateful logic is easy to find for the developer.



React Hook Rules

There are two rules of Hooks that must be complied with:

01

Only call Hooks from top-level components.

- This means that you should never call Hooks from within loops, conditionals, or nested functions.
- It is important that Hooks are always called in the same order, like component lifecycle methods.
- It is also what makes it possible for React to store the state of Hooks when using `useState` or `useEffect`.

02

Hooks may only be called from React components.

- Never call a Hook from a regular JavaScript function.
- This makes it so that all stateful logic is easy to find for the developer.

If we vary from these rules, our components will not work properly.

These rules apply to all Hooks, not just to `useState`.

Instructor Demonstration

useState

Questions?

Activity: `useState`

In this activity, you will practice using the `useState` Hook in React.

Suggested Time:

15 Minutes

Time's Up! Let's Review.

Why might using `value` with `onChange` be a bad idea?

Review: useState Activity

It all comes down to controlled input vs. uncontrolled input.

01 Controlled input

Accepts its current value as a prop and has a callback that allows you to change its value.

Whenever `onChange` updates its value, it's essentially the input controlling itself.

02 Uncontrolled input

Is an input that gets its value from somewhere else.

In our case, if `value={username}`, then the input would be getting its value from the state.

The combination of the two would result in the component going from uncontrolled to controlled, which is considered **bad practice**.

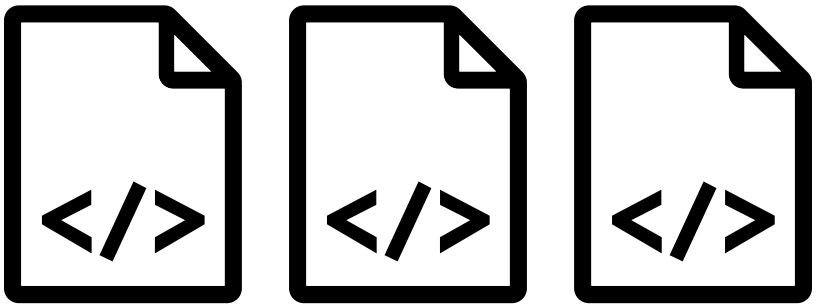
Instructor Demonstration

useEffect

useEffect Demo

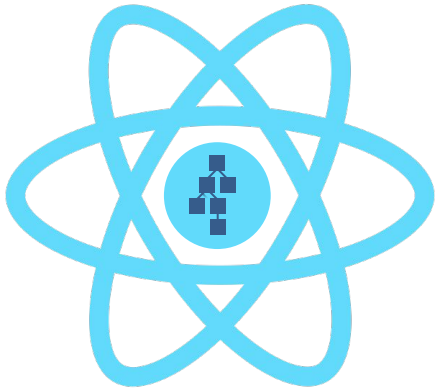
In the “outside world”:

Effects, often referred to as side effects, are bits of code responsible for the modification of state.



In React:

Effects are most commonly used for data fetching and manually changing the DOM.



useEffect Demo

`useEffect` is a method that takes two arguments.

01 First argument

A function that you want to run after the component mounts.

02 Second argument

An array of dependencies, commonly referred to as “deps.”

Every time the component re-renders, the `useEffect` Hook will check to see if any of the values in its dependency array have changed.

- If they have, then the function that you supplied as the first argument of `useEffect` will run again.
- If not, React will skip the effect for that particular render.

Questions?

Activity: `useEffect`

In this activity, you will practice using the `useState` and `useEffect` Hooks in React by transforming a stateful class component into a functional component with React Hooks.

Suggested Time:

20 Minutes

Time's Up! Let's Review.

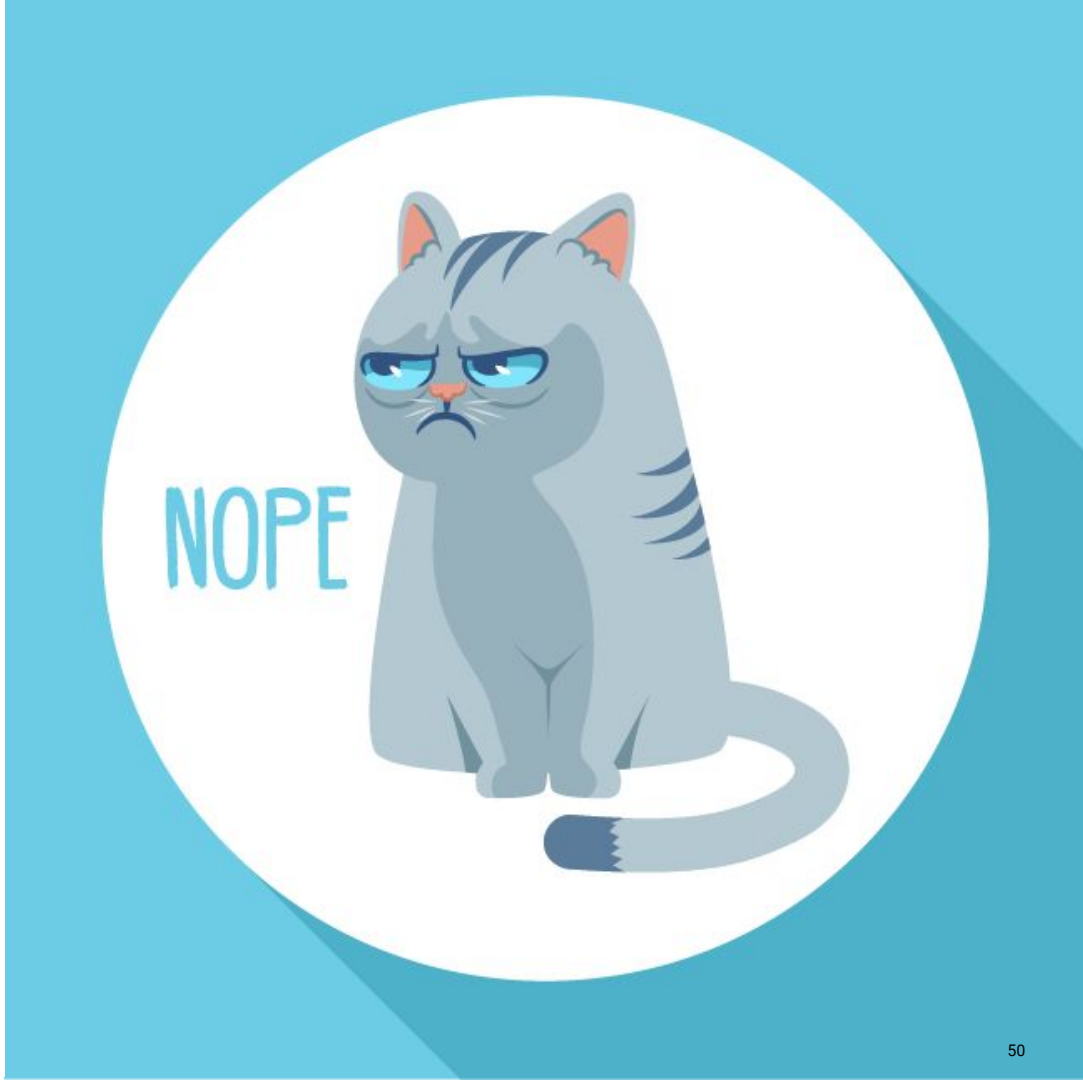
What was the point of this?

Writing functional components is much cleaner.

Using Hooks allows you to write fewer lines of code and manage your state in a less complex way. (No this keyword required!)

If we use Hooks, can state be used by other components?

The state used within a single component cannot be used by different components.



Can you think of a concept that would allow us to share state across components?

For now, we can use props,
but in the future, you will learn
a better way.

For now, we can use props, but in the future, you will learn a better way.

Questions?


Break

Instructor Demonstration

Custom Hooks

Custom Hooks

Only call Hooks from top-level components.

Only call Hooks from React components.

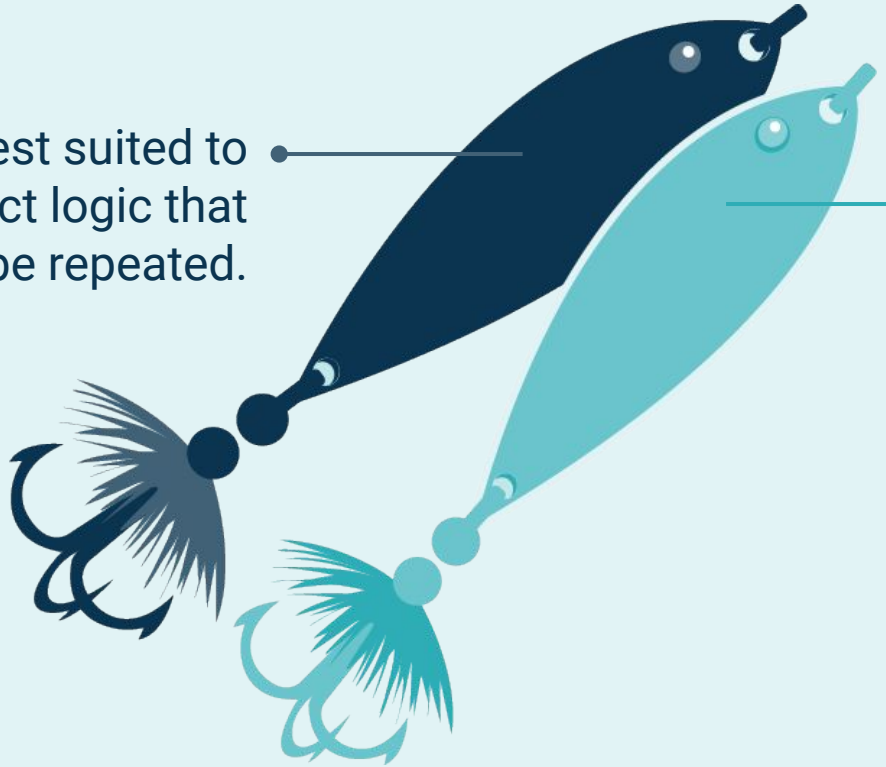
Never call Hooks from within loops, conditionals, or nested functions.

Never call a Hook from a regular JavaScript function.

Custom Hooks Can Be Practically Anything!

Custom Hooks are:

Best suited to extract logic that may be repeated.



A great way to keep your React functions pure.

Custom Hooks

As with the two rules of Hooks...

Custom Hooks must start with the word `use` so that React can ensure that your code is adhering to the two rules of Hooks.

As with `useState` and `useEffect`,

Different components that use the same custom Hook **do not** share the same state.

Activity: Custom Hooks

In this activity, you will practice using custom Hooks by creating a `useDebounce` Hook that will delay the invoking of a function for a given number of milliseconds.

Suggested Time:

15 Minutes

Time's Up! Let's Review.

Questions?

Activity: Third-Party Hooks

In this activity, you will practice using third-party Hooks. Specifically, you will be creating a survey form using the `react-hanger` package on npm.

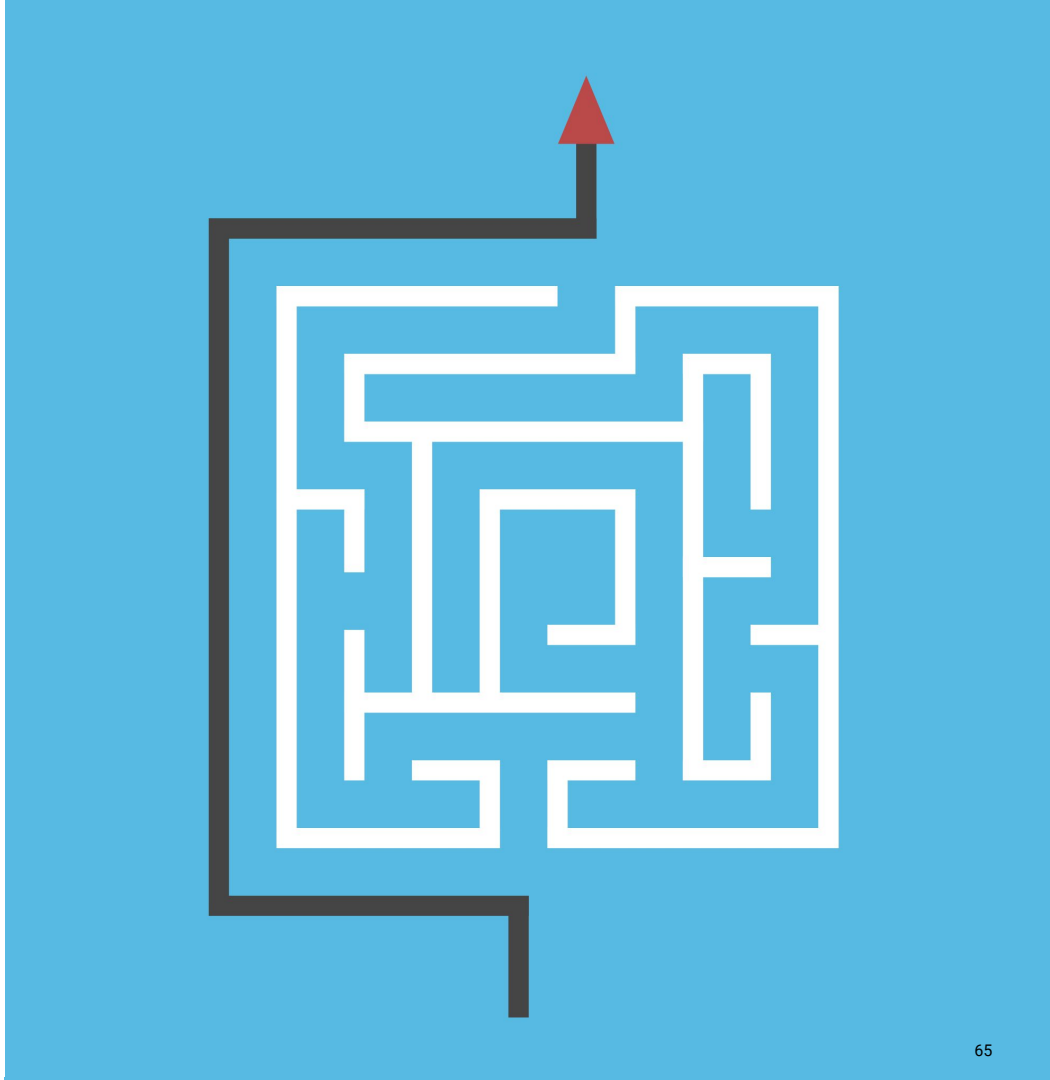
Suggested Time:

20 Minutes

`react-hanger` is one of many custom Hooks packages on

There are many ways to satisfy the requirements of this application.

It is recommended that you attempt the **most straightforward solution** first, then refactor your working app.



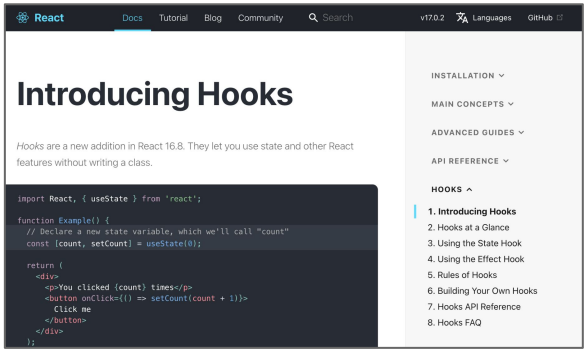
Time's Up! Let's Review.

Questions?

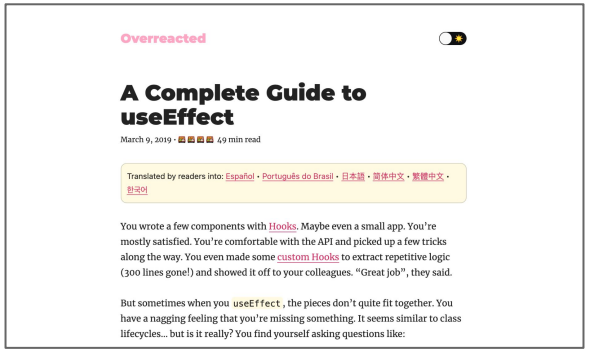
Next Class

Do your best to go through the following sections of the React documentation before the next class:

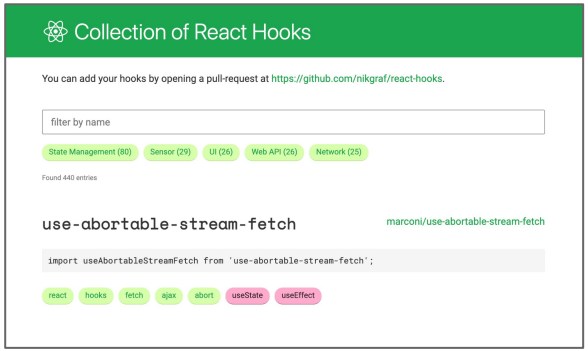
[React Hooks Docs]



[A Complete Guide to useEffect()]



[List of React Hooks]




The End