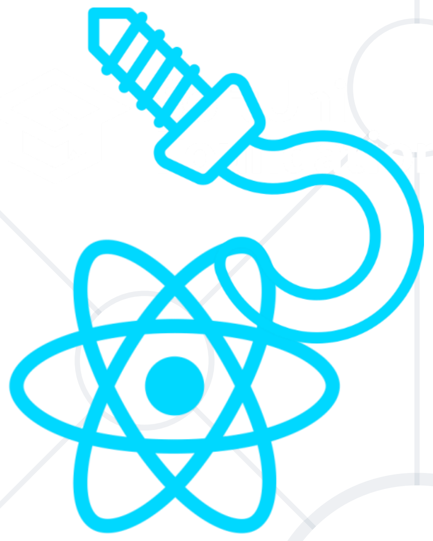
React Hooks

Introduction, State & Effect Hooks



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React Timeline

March 2013
April 2015
February 2019

Timeline

March 2013: React v0.3.0 introduces the concept of components.

April 2015: React v0.13.0 introduces the React.Component base class, leading to the use of class components.

February 2019: React v16.8 introduces Hooks, allowing functional components to manage state and side effects.

Introduction

- React Hooks
  - JS functions which can be only used inside Functional Component or other Hooks
  - New feature in **React 16.8**
  - Let you **use state** and **other** React features **without** writing a class

Introduction

- React Hooks have specified naming
  - Starting with lowercase: "**`use`** "
  - Followed by function name like: "**`State`**"
    - **`useState`**, **`useEffect`**, **`useContext`**…
- The basic idea is to **expose** stateful functionalities to functional component
  - **managing state**
  - **adding lifecycle methods**

Introduction

- You can make **everything** work that you could make working class based components
- The are **highly re-usable** and **independent** for each component
  - Using hooks to **share functionality, NOT** data between components
- React hooks **have nothing** to do with Lifecycle Methods
  - Can't replace lifecycle methods with React hooks

State Hook

State Hook

- Hook is a special function that lets you "hook into" React features
  - **useState** is a Hook that lets you add **React state** to function components
  - You don't have to convert functional component into class to use state

State Hook

- Calling **useState** hook inside functional component to add some local state to it

```
import { useState } from 'react';
```

- React will preserve this state between re-renders
- **useState** returns a pair

```
const [count, setCount] = useState(0);
```

  - Current state **value**
  - **Function** that lets you update it

State Hook

```
import { useState } from 'react';

const counter = () {
  const [count, setCount] = useState(0);
  return (
    <div>
      <p>Counter: {count}</p>
      <button onClick={() => setCount(count + 1)}>
        Click me
      </button>
    </div>
  );
}
```

State Hook

- You can call the update function from anywhere
- It's similar to **this.setState** in class, except it **doesn't merge** the **old** and **new** state together
- The only argument to **`useState`** hooks is the **initial state**
  - Unlike **this.state**, here doesn't have to be an object
    - Although it can be if you want

State Hook

- You can use the **State Hook** more than once in a single component

```
const registerComponent = () {
  const [email, setEmail] = useState("");
  const [age, setAge] = useState("0");
  const [password, setPassword] = useState("");
  // ...
}
```

- The initial state argument is only used during the **first render**

Effect Hook

Effect Hook

- You most likely perform: **data fetching**, **subscriptions** or **manually changing the DOM**
  - Operations like these are called **side effects**
  - They can **affect** other components and can't be done during the rendering
- **useEffect** hook adds the ability to perform side effects from a function component

Effect Hook

- **useEffect** hook serves the same purpose as
  - `componentDidMount`
  - `componentDidUpdate`
  - `componentWillUnmount`
- But they are bundled into a single API

```
import { useEffect } from 'react';
```

Effect Hook

- **useEffect** hook accepts a function that contains imperative, possibly effectful code
  - That function will run **after the render** is committed to the screen
- By default effects run after **every completed render**
  - But you can choose to fire them only when certain value have changed

Effect Hook

```
import { useState, useEffect } from 'react';

const counter = () {
  const [count, setCount] = useState(0);
  useEffect(() => {
    document.title = `The counter reached: ${count} times`;
  });

}
```

Effect Hook

- When you call **useEffect** you're telling React to run your "effect" function after flushing changes to the DOM
- Effects are declared inside the component so they have access to its **props** and **state**
- Effects may also optionally specify how to "clean up" after them by **returning** a **function**

Effect Hook

- Often, effects create resources that need to be **cleaned up** before the component leaves the screen
  - To do this, the function passed to **`useEffect`** may return a **clean-up function**

```
useEffect(() => {
  const subscription = props.source.subscribe();
  return () => {
    // Clean up the subscription
    subscription.unsubscribe();
  };
});
```

Custom Hooks

Custom Hooks

- Sometimes, is necessary to reuse some stateful logic between components
- Traditionally, there were two popular solutions to this problem
  - **Higher-order components**
  - **Render props**
- Custom Hooks let you do this, but without adding more components to your tree

Custom Hooks

- A custom hook is simple JS function whose **name starts with "use"** and that may call other Hooks
- Unlike a React component, a custom Hook **doesn't need** to have a specific signature
- We can decide
  - **What it takes as arguments**
  - **What should return**

Rules of Hooks

Rules of Hooks

- Hooks are JavaScript functions, but you need to follow two rules when using them
  - **Only Call Hooks at the Top Level**
  - **Only Call Hooks from Functional Components**

Only Call Hooks at the Top Level

- **Don't call Hooks inside loops, conditions, or nested functions**
  - By following this rule, you ensure that Hooks are called in the same order each time a component renders
  - That's what allows React to correctly preserve the state of Hooks between multiple useState and useEffect calls

Only Call Hooks from Functional Components

- **Don't call Hooks from regular JavaScript functions. Instead, you can**
  - **Call Hooks from React function components**
  - **Call Hooks from custom Hooks**
- By following this rule, you ensure that all stateful logic in a component is clearly visible from its source code

Context

Context

- Context provides way to pass data through the component tree without passing the props manually
- Context API
  - `React.createContext`
  - `Context.Provider`
  - `useContext`

Context

- Context is designed to **share data** that can be considered **global**
  - Current authenticated user
  - Theme
  - Preferred language
- Using context, we can **avoid passing props** through intermediate elements

Context

- Context is **primarily** used when
  - Some data needs to be accessible by **many** components at **different** nesting levels
- Apply it **sparingly** because it makes component **reuse** more **difficult**
- Using Context only the top-most Page Component know about your data

Context API

- React.createContext

```
const someContext = React.createContext(defaultValue);
```

  - Creates a Context object
  - While rendering will read the current context value from the closest matching Provider above it in the tree
  - The default value is used only when a component does not have a matching Provider above it in the tree

Context API

- **Context.Provider**

```
<MyContext.Provider value={/* some value */}>
```

  - Every Context object comes with a Provider React component
    - Allowing consuming components to subscribe to context changes
  - Accepts a **value prop** to be passed to consuming components
  - **One Provider** can be connected to **many consumers**

Context API

- **useContext**
  - Accepts a context object
  - Return the current context value for that context
  - The current context value is determined by the value prop of the nearest **Provider**
  - Argument to useContext must be the context object itself

```
const ThemeContext = React.createContext(themes.light);
...
const theme = useContext(ThemeContext);
```

Summary

- Hooks is a special functions that lets you "hook into" React features
- `useState` lets you add React state to function components
- useEffect adds the ability to perform side effects from a function component
- Custom Hooks are normal JS functions, whose names starts with "use"
- There is two rules of using Hooks

Summary

- Context provides way to pass data through the component without passing the props manually
  - Context API
- More Hooks
  - useContext

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