TIKAL
Fullstack as a service

Fullstack
Developers

React Hooks

Enhancing functional components

React component Types

Stateless

- Pure function with no side-effects
- No internal state
- No lifecycle hooks
- Simple
- Easy to reuse
- Easy to test

Stateful

- Class components
- Retain internal state
- Enables lifecycle interaction
- Complex
- Not easy to test internal logic

What are hooks

Functions that enhance **Functional Components** with state maintaining and side-effects capabilities

Why do we need them?

- Class components become complex and difficult to maintain and test
- Class components lifecycle functions group different logic and cause confusion.
- More reusable code
- Reduce complexity of HoC layers

The setState hook

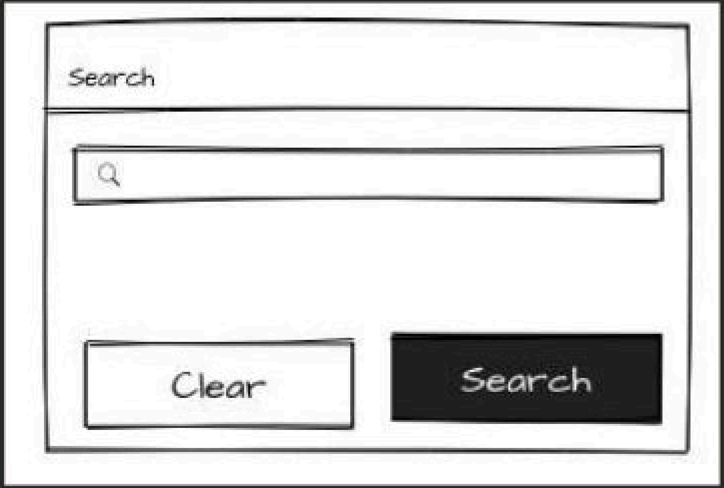
```
const [stateVal, updateValFn] = React.useState(initialVal)
```

```
Export class Counter extends React.Component {
    state = {
        counter: 0,
    };

    setCounter = (val) => {
        this.setState(val);
    }

    render() {
        const { counter } = this.state;
        return (
            <div className="App">
                <div>{counter}</div>
                <div>
                    <button onClick={() => this.setCounter(counter + 1)}>+1</button>
                    <button onClick={() => this.setCounter(counter - 1)}>-1</button>
                </div>
            </div>
        );
    }
}
```

```
import React from 'react';

export function Counter() {
    const [counter, setCounter] = React.useState(0);
    return (
        <div className="App">
            <div>{counter}</div>
            <div>
                <button onClick={() => setCounter(counter + 1)}>+1</button>
                <button onClick={() => setCounter(counter - 1)}>-1</button>
            </div>
        </div>
    );
}
```

Practice Time

Create Functional Component with useState



The useEffect hook

Used to add side effect capabilities to the functional component. This is a combination of *componentDidMount*, *componentDidUpdate*, and componentWillUnmount

```
React.useEffect(sideEffecFn, [dependencies]): cleanupFn
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```

- **sideEfectFn**: A function that can perform a side effect, e.g. async call to fetch data
- **dependencies** (Array): A list of values that if changed will trigger the sideEffectFn and cause a re-render
- cleanupFn: the (optional) returned value of the side effect - triggered before each re-render - used for cleaning up, e.g. unregistering from events

```
class Example extends React.Component {
  state = {
      count: 0
  };

  componentDidMount() {
    document.title = `You clicked ${this.state.count} times`;
  }

  componentDidUpdate() {
    document.title = `You clicked ${this.state.count} times`;
  }

  render() {
    return (
      <div>
        <p>You clicked {this.state.count} times</p>
        <button onClick={() => this.setState({ count: this.state.count + 1 })}>
          Click me
        </button>
      </div>
    );
  }
}
```

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

function Example() {
  const [count, setCount] = useState(0);


  useEffect(() => {
    document.title = `You clicked ${count} times`;
  });

  return (
    <div>
      <p>You clicked {count} times</p>
      <button onClick={() => setCount(count + 1)}>
        Click me
      </button>
    </div>
  );
}
```

The dependencies optional parameter

Every time the component renders the effect is ‘useEfect’ is triggered.

It compares the values in this array to the values of the previous execution.

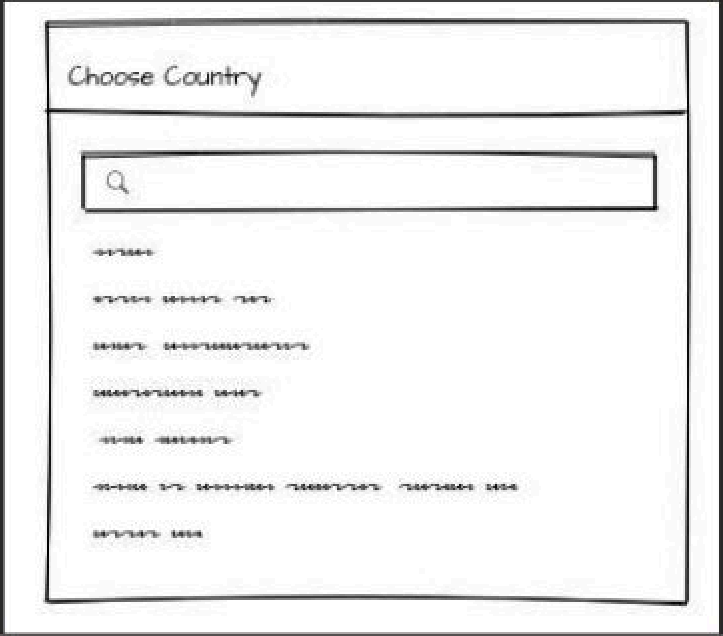
If the values do not change then the sideEffectFn will not re-execute.

- No array given (undefined) - will execute on every render (componentDidMount + componentDidUpdate)
- An empty array given - will execute once (componentDidMount)
- Array with values - will execute only if one of the values has changed

Practice Time

Create country auto-complete using useEffect

https://restcountries.eu/rest/v2/name/:query



Build your own hooks

Custom hooks are reusable functions that encapsulate *useState* and *useEffect* methods

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


function useFriendStatus(friendID) {

     const [isOnline, setIsOnline] = useState(null);

          useEffect(() => {
                    function handleStatusChange(status) {
                    setIsOnline(status.isOnline);
                    }

                    ChatAPI.subscribeToFriendStatus(friendID, handleStatusChange);
                    return () => {
                    ChatAPI.unsubscribeFromFriendStatus(friendID, handleStatusChange);
                    };
          });

          return isOnline;
}
```

```
function FriendStatus(props) {
	const isOnline = useFriendStatus(props.friend.id);

	if (isOnline === null) {
			return 'Loading...';
		}

	return isOnline ? 'Online' : 'Offline';
}



function FriendListItem(props) {
	const isOnline = useFriendStatus(props.friend.id);

	return (
			<li style={{ color: isOnline ? 'green' : 'black' }}>
				{props.friend.name}
			</li>
		);

}}
```

Practice:

Create a ‘useCountryName’ hook.

It will accept a country ISO code (e.g. ISR) and return the country name.

http://restcountries.eu/rest/v2/alpha/ISR

More Hooks

- useContext
- useReducer
- useCallback
- useMemo
- useRef

The useContext hook

Gives access to the component's context if a context provider was set higher in the hierarchy

```
const value = useContext(MyContext);
```

Practice

Extract the api client (has a “fetch” function) and pass it in as Context

```
import React from "react";

export const apiClient = {
  getData: (query: string) =>
    fetch(`https://restcountries.eu/rest/v2/name/${query}`)
      .then(res => res.json())
      .then(countries => countries.map((c: any) => c.name))
};

export const ApiContext = React.createContext(apiClient);
```

```
import React from "react";
import { Search } from "./components/Serach";
import { ApiContext, apiClient } from "./api/ApiClient";

const App: React.FC = () => {
  return (
    <ApiContext.Provider value={apiClient}>
      <div className="App">
        <Search />
      </div>
    </ApiContext.Provider>
  );
};

export default App;
```

```
const apiClient = useContext(ApiContext);
useEffect(() => {
  if (query) {
    apiClient.getData(query).then(names => setCountries(names));
  }
}, [query]);
```

The useReducer hook

Similar to useState

```
const [state, dispatch] = useReducer(reducer, initialArg, init);
```

When do we use it?

Instead of passing down callbacks to update the state in a large component tree - you can pass the dispatch function in the context

```
const TodosDispatch = React.createContext(null);

function TodosApp() {

 // Note: `dispatch` won't change between re-renders

 const [todos, dispatch] = useReducer(todosReducer);


  return (
    <TodosDispatch.Provider value={dispatch}>
      <DeepTree todos={todos} />
    </TodosDispatch.Provider>
  );
}
```

```
function DeepChild(props) {

 // If we want to perform an action, we can get dispatch
from context.

 const dispatch = useContext(TodosDispatch);


  function handleClick() {
    dispatch({ type: 'add', text: 'hello' });
  }

  return (
    <button onClick={handleClick}>Add todo</button>
  );
}
```

The useCallback hook

```
const memoizedCallback = useCallback(
  () => {
    doSomething(a, b);
  },
  [a, b],
);
```

When to use it?

When passing a function to children - avoid re-rendering due to new function creation.

Render checks use ‘===’ comparison of params

The **useMemo** hook

```
const memoizedValue = useMemo(() => computeExpensiveValue(a, b), [a, b]);
```

Practice:

1. Extract the search button to a seperate component - "SearchButton"
2. Prevent the SearchButton component from re-rendering on every text change.

The useRef hook

```
const refContainer = useRef(initialValue);
```

```
function TextInputWithFocusButton() {
  const inputEl = useRef(null);

  const onButtonClick = () => {
    // `current` points to the mounted text input element
    inputEl.current.focus();
  };
  return (
    <>
      <input ref={inputEl} type="text" />
      <button onClick={onButtonClick}>Focus the input</button>
    </>
  );
}
```