# React

1. React is a JavaScript library for building user interfaces.
2. React is used to build single-page applications.
3. React allows us to create reusable UI components.

import React from 'react';

import ReactDOM from 'react-dom/client';

function Hello(props) {

return <h1>Hello World!</h1>;

}

const root = ReactDOM.createRoot(document.getElementById("root"));

root.render (<Hello />);

## How does React Work?

React creates a VIRTUAL DOM in memory. Instead of manipulating the browser's DOM directly, React creates a virtual DOM in memory, where it does all the necessary manipulating, before making the changes in the browser DOM. React finds out what changes have been made, and changes **only** what needs to be changed.

# Introducing JSX

1. JSX stands for JavaScript XML.
2. JSX allows us to write HTML in React.
3. JSX makes it easier to write and add HTML in React.
4. With JSX you can write expressions inside curly braces { }.

const myElement = <h1>React is {5 + 5} times better with JSX</h1>;

1. inserting a Large Block of HTML

const myElement = (

<ul>

<li>Apples</li>

<li>Bananas</li>

<li>Cherries</li>

</ul>

);

1. Use ternary expressions instead:

const myElement = <h1>{(x) < 10 ? "Hello" : "Goodbye"}</h1>;

# React Render

1. React's goal is in many ways to render HTML in a web page.
2. React renders HTML to the web page by using a function called **ReactDOM.render()**

<body>

<div id="root"></div>

</body>

ReactDOM.render( <p>Hello</p> , document.getElementById('root') );

# React Components

Components are like functions that return HTML elements

Components come in two types,

1. Class components
2. Function components

In react, component data flow from top to bottom. data cannot flow both direction.

So it is become problem for data handling. For solve this problem, we various method.

# Lifting state:

In lifting solution, all state handle by top level component. Then with props we send handler and state to bottom component.

In view:



Here component A export component B, C. here component B take input but cannot send to component C. So, it is a problem to send data to other component. to solve this, we use lifting state up

A

-State

-method

C

-props.state

-props.method

B

-props.state

-props.method

Here all state and function are in top lavel component A. then with props component sent to B and C. it is called lifting state up.

# Composition vs Inheritance

## Inheritance:

Inheritance is a mechanism in which one object acquires all the properties and behaviors of a parent object.

class Car {

  constructor(brand) {

    this.carname = brand;

  }

  present() {

    return 'I have a ' + this.carname;

  }

}

class Model extends Car {

  constructor(brand, mod) {

    super(brand);

    this.model = mod;

  }

  show() {

    return this.present() + ', it is a ' + this.model;

  }

}

**Problem of inheritance:**

1. In inheritance, react child component extends all parent component method. If child want to use single method of parent component it not possible.
2. component is tightly coupled.
3. from child it not clear what parents does.

## Composition:

composition is the name for passing components as props to other components, thus creating new components with other component. Props.children are used for composition value.

function App () {

  return (

    <div>

       <Hello>

 <h2> name </h2>

       </Hello>

    </div>

  )

}

export default function Hello(props) {

  return (

    <div>

        { props.children }

    </div>

  )

}

# Pattern of share State of react

To share same functionality in all component there are two pattern.

1. higher order component
2. props rendering

# Higher-Order Components

* higher-order component is a function that takes a component and returns a new component. Where as a component transforms props into UI, a higher-order component transforms a component into another component.

const EnhancedComponent = higherOrderComponent(WrappedComponent);

* when we use similar function in various component, we use higher-order component. we can solve it by lifting state up. In lifting state up, we send component in props. If want to send very deep component it is very bad. So, in react some time lifting state up is not good for component. so we use HOC in react.
* If we want to more add component/event in component it is very difficult to add component in every other component. With higher order component is very easy.

function add (a, b) {

  return a + b

}

function higherOrder(a, addReference) {

  return addReference(a, 20)

}

//Function call

higherOrder(30, add) // 50

## Component without HOC:

A

B

D

C

D

RETURN

## Component with HOC:

Hoc function :

**const WithCounter = (OriginalCom) => {**

**class NewCom extends React.Component {**

**state = {**

**count: 0,**

**};**

**handle = () => {**

**this.setState((m) => ({**

**count: m.count + 1,**

**}));**

**};**

**render() {**

**const {count} = this.state;**

**return <OriginalCom count={count} handle={this.handle} />**

**}**

**}**

**return NewCom;**

**};**

**export default WithCounter;**

other function.

**import WithCounter from "./WithCounter";**

**const ClickCounter = (props) => {**

**const {count , handle} = props;**

**return (**

**<div>**

**<button type="button" onClick={handle}>**

**click {count} times**

**</button>**

**</div>**

**);**

**};**

**export default WithCounter(ClickCounter);**

main function

function App() {

  return (

    <ClickCounter />

  )

}

A

D

RETURN

B

C

We create new component with a state, that use in various component. Then we pass all the component in new state component and become other component.

# Props Rendering

# Use state

1. hook use in top level of code.
2. hook use in react function only.

Syntax:

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

Example:

import React, { useState } from 'react';

function Example() {

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

return (

<div>

<p>You clicked {count} times</p>

<button onClick={() => setCount(count + 1)}>

Click me

</button>

</div>

);

}

Use Effect

React are works for –

1. render UI

2. React on user input and action

3. Render JSX

4. manage state & props

5. Evaluate State and props change

React also do various work

1. fetching data from API

2. updating Dom

3. setting any Subscription or timer

This type of work called side effect

The side effect handle in class component with the method of-

1. componentDidMount ()

2.componentDidUpdate ()

3.componentWillUpdate ()

Here is some problem to use this method –

1. repeating code

2. unorganized code

In useEffect we solve all problem in functional component.

1. Help us perform side Effect in functional components

2. Solves all the problem of lifecycle methods in class component

3. we do not repeat the code.

Use Effect is a function which run every render. We write a function inside useEffect for our purpose.

**Syntax:**

useEffect ( peram1 , peram2 );

param1: take a function.

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

param2:

1. setState variable , for which useEffect called or not.

2. if param2 = [ **]** then useEffect called only one time.

useEffect(() => {

document.title = `You clicked ${count} times`;

}, **[]** );

3. useEffect function also return a function. That do as like componentWillUnmount.

useEffect(() => {

document.title = `You clicked ${count} times`;

return ()=>{

}

}, **[]** );

**Example:**

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>

);

}

React Memo

1. memo use in component.

2. memo use for skip rendering a component if its props have not changed.

Example :

import { memo } from "react";

const Todos = ({todos}) => {

console.log ("child render");

return (

<>

<h2>My Todos</h2>

{ todos.map((todo, index) => {

return <p key={index}>{todo}</p>;

}) }

</>

);

};

export default memo(Todos);

ref problem in memo:

In react function are reference type data. When we called a function, the function reference is change. So that react new render function is new function. We solve by usecallback function .

useCallback

The React useCallback Hook returns a memoized callback function.

Syntex:

const addTodo = useCallback( param\_1, param\_2 );

param1: take a function.

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

param2:

1. dependency variable , for which useCalled called or not.

Example:

import { useState, useCallback } from "react";

import ReactDOM from "react-dom/client";

import Todos from "./Todos";

const App = () => {

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

const [todos, setTodos] = useState([]);

const increment = () => {

setCount((c) => c + 1);

};

const addTodo = useCallback( () => {

setTodos((t) => [...t, "New Todo"]);

}, [todos] );

return (

<>

<Todos todos={todos} addTodo={addTodo} />

<hr />

<div>

Count: {count}

<button onClick={increment}>+</button>

</div>

</>

);

};

useMemo

The React useMemo Hook returns a memoized value. The useMemo Hook only runs when one of its dependencies update.

Syntex:

const addTodo = useMemo( param\_1, param\_2 );

param1: take a function.

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

param2:

1. dependency variable , for which useCalled called or not.

Example:

import { useState, useMemo } from "react";

const App = () => {

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

const [todos, setTodos] = useState([]);

const calculation = useMemo( ()=> {

for (let i = 0; i < 1000000000; i++) {

num += 1;

}

return num;

}, [count]);

const increment = () => {

setCount((c) => c + 1);

};

const addTodo = () => {

setTodos((t) => [...t, "New Todo"]);

};

return (

<div>

<div>

<h2>My Todos</h2>

{ todos.map((todo, index) => {

return <p key={index}>{todo}</p>;

}) }

<button onClick={addTodo}>Add Todo</button>

</div>

<hr />

<div>

Count: {count}

<button onClick={increment}>+</button>

<h2>Expensive Calculation</h2>

{calculation}

</div>

</div>

);

};

useRef

useReducer

1. The useReducer Hook is similar to the useState Hook.
2. It allows for custom state logic.

Syntax

The useReducer Hook accepts two arguments.

useReducer(<reducer>, <initialState>)

# React Router (V5 )

To add React Router in your application

npm i -D react-router-dom

## Basic Usage:

import ReactDOM from "react-dom/client";

import { BrowserRouter, Routes, Route } from "react-router-dom";

import Layout from "./pages/Layout";

import Home from "./pages/Home";

export default function App() {

return (

<BrowserRouter>

<Route path="/" element={Layout} />

<Route path=”/home” element={ Home } />

</BrowserRouter>

);

}

If route is “/” then it open “/”, “/home” both component . becaouse in react route match with Browser Route.

## Exact Route:

to use exact route use exact.

<BrowserRouter>

<Route exact path="/" element={Layout} />

<Route exact path=”/home” element={ Home } />

</BrowserRouter>

## Not found route:

<BrowserRouter>

<Route exact path="/" element={Layout} />

<Route exact path=”/home” element={ Home } />

<Route component={ Error } />

</BrowserRouter>

## Switch:

If we want to found first route, we use switch .

<BrowserRouter>

<switch>

<Route exact path="/" element={Layout} />

<Route exact path=”/home” element={ Home } />

<Route component={ Error } />

<switch>

</BrowserRouter>

## Dynamic Route:

<Route exact path="/" element={Layout} />

<Route exact path=”/home/: id” element= {Home} />

## Props in Route Component:

<Route exact path="/">

<Layout handle={add} />

<Route/>

<Route exact path=”/home/: id” >

<Home />

<Route/>

## Route in Render Props:

<Route exact path="/" render={ ()=> <Layout name=”shuvo” />} />

## Redirect Router:

<Route exact path="/" >

<Redirect to=”/home” />

<Route>

## Link:

<Link to="/home ">Home</Link>

<Link to="/ ">layout</Link>

## Link Parameter:

<Link to="/home?name=shuvo ">layout</Link>

## Link Object:

<Link to= {{

Pathname: “/home”,

Search: “?name=shuvo”,

Hash: “mt5”,

State: { status: true }

}} />

## NavLink :

To control style we use NavLink.

<NavLink exact

to="/home?name=shuvo"

activeStyle={{

fontWeight : ‘blod’,

color : ‘red’

}}

>

layout

</NavLink>

# Route Hooks

**useHistory:** The useHistory hook gives you access to the [history](https://v5.reactrouter.com/web/api/history) instance that you may use to navigate.

Example:

import { useHistory } from "react-router-dom";

function HomeButton() {

let history = useHistory();

function handleClick() {

history.push("/home");

}

return (

<button type="button" onClick={handleClick}>

Go home

</button>

);

}

**useLocation:** The useLocation hook returns the location object that represents the current URL

function usePageViews() {

let location = useLocation();

React.useEffect(() => {

ga.send(["pageview", location.pathname]);

}, [location]);

}

**useParams:** useParams returns an object of key/value pairs of URL parameters

function BlogPost() {

let { slug } = useParams();

return <div>Now showing post {slug}</div>;

}

**useRouteMatch**:

# React Router (V6)

In react router V6-

1. No **switch** statement.
2. No **Exa**ct keyword
3. No **redirect** keyword

## Basic Usage:

import ReactDOM from "react-dom/client";

import {BrowserRouter, Routes, Route} from "react-router-dom";

import Layout from “. /pages/Layout";

import Home from “. /pages/Home";

export default function App () {

return (

<BrowserRouter>

<Route path="/” element= {<Layout />}

<Route path=”/home” element= {<Home />} />

<Route path=”/about” element= {<Navigate to=”/contact” />} />

</BrowserRouter>

);

}

## \* keyword:

<BrowserRouter>

<Routes>

<Route path="/” element= {<Layout />}

<Route path=”/home/\*” element= {<Home />} />

<Route path=”/home/:id” element= {<User />} />

<Route path=”/about” element= {<Navigate to=”/contact” />} />

<Routes>

</BrowserRouter>

## No active Module:

<NavLink to="/home?name=shuvo"

className={ (value)=>value.isActive ? classes.active : “ “ }

>

layout

</NavLink>