**React Router**

Routing is a process in which a user is directed to different pages based on their action or request. ReactJS Router is mainly used for developing Single Page Web Applications. React Router is used to define multiple routes in the application. When a user types a specific URL into the browser, and if this URL path matches any 'route' inside the router file, the user will be redirected to that particular route.

React Router is a standard library system built on top of the React and used to create routing in the React application using React Router Package. It provides the synchronous URL on the browser with data that will be displayed on the web page. It maintains the standard structure and behavior of the application and mainly used for developing single page web applications.

***What is Route?***

It is used to define and render component based on the specified path. It will accept components and render to define what should be rendered.

***Add React Router***

To add React Router in your application, run this in the terminal from the root directory of the application:

npm i -D react-router-dom

*Example:*

*Index.js*

import React from "react";

import ReactDOM from "react-dom/client";

import "./index.css";

import App from "./App";

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

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

root.render(

  <BrowserRouter>

    <App />

  </BrowserRouter>

);

*Home.js*

import React from "react";

const Home = () => {

  return (

    <div>

      <h3>Welcome, Home Page</h3>

    </div>

  );

};

export default Home;

*Contacts.js*

import React from "react";

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

const Contacts = () => {

  return (

    <div>

      <h3>Contact Us</h3>

      <Link to="/">

        <button className="btn btn-primary">Back to Home</button>

      </Link>

    </div>

  );

};

export default Contacts;

*Blog.js*

import React from "react";

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

const Blog = () => {

  return (

    <div>

      <h3>Blog Post</h3>

      <Link to="/">

        <button className="btn btn-primary">Back to Home</button>

      </Link>

    </div>

  );

};

export default Blog;

*Layout.js*

import React from "react";

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

const Layout = () => {

  return (

    <>

      <nav className="navbar navbar-expand-lg navbar-dark bg-secondary mb-5">

        <div className="container-fluid">

          <Link className="navbar-brand" to="/">

            React Router

          </Link>

          <div className="collapse navbar-collapse" id="navbarNav">

            <ul className="navbar-nav">

              <li className="nav-item">

                <Link className="nav-link active" to="/">

                  Home

                </Link>

              </li>

              <li className="nav-item">

                <Link className="nav-link" to="/blog">

                  Blogs

                </Link>

              </li>

              <li className="nav-item">

                <Link className="nav-link" to="/contact">

                  Contact Us

                </Link>

              </li>

            </ul>

          </div>

        </div>

      </nav>

    </>

  );

};

export default Layout;

*NoPage.js*

import React from "react";

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

const NoPage = () => {

  return (

    <div>

      <h3>404</h3>

      <h5>Page Not Found</h5>

      <Link to="/">

        <button className="btn btn-primary">Back to Home</button>

      </Link>

    </div>

  );

};

export default NoPage;

*App.js*

import "./App.css";

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

import Layout from "./Components/Layout";

import Home from "./Components/Home";

import Blog from "./Components/Blog";

import Contacts from "./Components/Contacts";

import NoPage from "./Components/NoPage";

function App() {

  return (

    <div className="App">

      <Layout />

      <Routes>

        {/\* <Route index element={<Layout />} /> \*/}

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

        <Route path="blog" element={<Blog />} />

        <Route path="contact" element={<Contacts />} />

        <Route path="\*" element={<NoPage />} />

      </Routes>

    </div>

  );

}

export default App;

**React Animations**

The animation is a technique in which images are manipulated to appear as moving images. It is one of the most used technique to make an interactive web application. In React, we can add animation using an explicit group of components known as the React Transition Group.

React Transition Group is an add-on component for managing component states and useful for defining entering and exiting transitions. It is not able to animate styles by itself. Instead, it exposes transition states, manages classes and group elements, and manipulates the DOM in useful ways. It makes the implementation of visual transitions much easier.

React Transition group has mainly two APIs to create transitions. These are:

* **ReactTransitionGroup:** It uses as a low-level API for animation.
* **ReactCSSTransitionGroup:** It uses as a high-level API for implementing basic CSS transitions and animations.

***Installation***

We need to install react-transition-group for creating animation in React Web application. You can use the below command.

npm install react-transition-group –save

***React Transition Group Components***

React Transition Group API provides three main components. These are:

* Transition
* CSSTransition
* Transition Group

***Transition***

It has a simple component API to describe a transition from one component state to another over time. It is mainly used to animate the ***mounting*** and ***unmounting*** of a component. It can also be used for in-place transition states as well.

We can access the Transition component into four states:

* entering
* entered
* exiting
* exited

***CSSTransition***

The CSSTransition component uses CSS stylesheet classes to write the transition and create animations. It is inspired by the ng-animate library. It can also inherit all the props of the transition component. We can divide the "CSSTransition" into three states. These are:

* Appear
* Enter
* Exit

CSSTransition component must be applied in a pair of class names to the child components. The first class is in the form of ***name-stage*** and the second class is in the ***name-stage-active*.** For example, you provide the name fade, and when it applies to the 'enter' stage, the two classes will be ***fade-enter***and ***fade-enter-active***. It may also take a prop as Timeout which defines the maximum time to animate.

***TransitionGroup***

This component is used to manage a set of transition components (Transition and CSSTransition) in a list. It is a state machine that controls the mounting and unmounting of components over time. The Transition component does not define any animation directly. Here, how 'list' item animates is based on the individual transition component. It means, the "TransitionGroup" component can have different animation within a component.

*Example:*

*ReactAnimation.js*

import React, { Component } from "react";

import { TransitionGroup } from "react-transition-group";

class ReactAnimation extends Component {

  constructor(props) {

    super(props);

    this.state = {

      items: ["Java", "Python", "React", "Angular"],

    };

    this.addItem = this.addItem.bind(this);

  }

  addItem = () => {

    const newItem = this.state.items.concat([prompt("Enter the New Item")]);

    this.setState({ items: newItem });

  };

  removeItem = (i) => {

    console.log(i);

    const newItem = this.state.items.slice(i);

    console.log(newItem);

    newItem.splice(i, 0);

    this.setState({ items: newItem });

  };

  render() {

    const items = this.state.items.map((item, i) => (

      <div key={item} onClick={() => this.removeItem(i)}>

        {item}

      </div>

    ));

    console.log(items);

    return (

      <div>

        <h3>React Animation</h3>

        <div className="card-body">

          <button className="btn btn-primary mx-3" onClick={this.addItem}>

            Insert Item

          </button>

        </div>

        <TransitionGroup

          transitionName="example"

          transitionEnterTimeout={800}

          transitionLeaveTimeout={600}

        >

          {items}

        </TransitionGroup>

      </div>

    );

  }

}

export default ReactAnimation;

*App.js*

import "./App.css";

import ReactAnimation from "./Components/ReactAnimation";

function App() {

  return (

    <div className="App">

      <ReactAnimation />

    </div>

  );

}

export default App;