**React Router**

**11. Routing in React (React Router)**

**Q:-1: What is React Router? How does it handle routing in single-page applications?**

React Router is a standard library for routing in React applications. It enables navigation between different views or components in a React app, allowing you to build a Single Page Application (SPA) with multiple "pages."

In a normal multi-page website, every time a user clicks a link, the browser makes a new request to the server and reloads the entire page. But in an SPA with React Router:

* Only one HTML page (index.html) is loaded initially.
* When the user navigates, React Router changes the URL in the browser without refreshing the whole page.
* It dynamically renders the required React component for that route.

This creates a smooth user experience with faster navigation, since only the content changes while the page structure remains the same.

**Q:-2: Explain the difference between BrowserRouter, Route, Link, and Switch components in React Router.**

**1. BrowserRouter**

* It is the parent component that enables routing in a React app.
* It uses the HTML5 history API (pushState, replaceState) to keep the UI in sync with the URL.
* Must wrap around all components that use routing.

**<BrowserRouter>**

**<App />**

**</BrowserRouter>**

**2. Route**

* Defines the path-to-component mapping.
* When the URL matches the path, the corresponding component is rendered.

**<Route path="/about" element={<About />} />**

**3. Link**

* Used for navigation between routes.
* Works like an <a> tag but without reloading the page.
* Updates the URL and lets React Router render the right component.

**<Link to="/about">Go to About</Link>**

**4. Switch (React Router v5) / Routes (React Router v6)**

* Ensures that only one matching route is rendered.
* Without Switch, multiple routes may match and render simultaneously.
* In React Router v6, Switch is replaced with Routes.

**<Switch>**

**<Route path="/" exact component={Home} />**

**<Route path="/about" component={About} />**

**</Switch>**