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

React Router is a standard routing library for React that lets you build single-page applications (SPAs) with navigation — without full page reloads.

Instead of navigating to new HTML pages like traditional websites, React Router changes the URL and shows components dynamically — all within the same page.

**🚦 How does React Router handle routing in SPAs?**

**🧠 In Traditional Apps:**

* Every link opens a new HTML file from the server.
* Full page reload happens.

**⚛️ In React SPA with React Router:**

* The app loads a single HTML file (index.html).
* Navigation just swaps React components based on the URL — no reload.
* The URL updates (like /about, /contact), but the page doesn’t refresh.

**🧾 Example:**

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

import Home from './Home';

import About from './About';

function App() {

return (

<BrowserRouter>

<nav>

<Link to="/">Home</Link> | <Link to="/about">About</Link>

</nav>

<Routes>

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

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

</Routes>

</BrowserRouter>

);

}

* Clicking <Link to="/about"> updates the URL to /about.
* React Router intercepts it and shows the <About /> component — no refresh!

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

**1. 🔁 <BrowserRouter>**

* It’s the **main wrapper** for your app’s routing system.
* Uses the **HTML5 history API** (pushState, replaceState) to keep your UI in sync with the URL.
* You must wrap your entire app with it for routing to work.

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

<BrowserRouter>

<App />

</BrowserRouter>

**2. 🛣️ <Route>**

* Defines a **path** and **what component to render** when the path matches.
* It goes inside <Routes> (React Router v6) or <Switch> (React Router v5).

<Route path="/about" element={<About />} /> // React Router v6

<Route path="/about" component={About} /> // React Router v5

**3. 🔗 <Link>**

* Used instead of <a href=""> to navigate **without reloading the page**.
* Prevents full page refresh and uses client-side routing.

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

If you use <a href="/about">, it causes a full reload — avoid this in SPAs.

**4. 🔀 <Switch> (only in React Router v5)**

* Renders the **first matching <Route>** only.
* Prevents multiple routes from rendering when paths overlap.

<Switch>

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

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

</Switch>

🔄 **In React Router v6**, <Switch> was **replaced with <Routes>** and is no longer used.