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

* **React Router** is a standard library used in React apps to **handle routing** (navigation between different pages or views) without reloading the browser.
* It makes a **Single Page Application (SPA)** behave like a traditional multi-page website — but instead of the server loading a new page, **React Router dynamically changes components** based on the URL.
* It uses the **browser's History API** (or hash in older versions) to **update the URL** and render the right component without refreshing the page.

**Example basic setup:**

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

function App() {

return (

<BrowserRouter>

<Routes>

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

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

</Routes>

</BrowserRouter>

);

}

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

| **Component** | **Purpose** |
| --- | --- |
| **BrowserRouter** | Wraps the entire application and enables routing using the **HTML5 history API** (clean URLs like /home, /about). |
| **Route** | Maps a **URL path** to a **React component**. When the path matches, it renders that component. |
| **Link** | Used instead of <a> tags for navigation between routes **without page refresh**. It updates the URL and renders the new component. |
| **Switch** (v5) / **Routes** (v6+) | In **React Router v5**, <Switch> renders the first <Route> that matches the URL. In **v6**, it's replaced by <Routes>, which is smarter and matches more predictably. |

**Example in React Router v5 (with Switch):**

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

function App() {

return (

<BrowserRouter>

<nav>

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

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

</nav>

<Switch>

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

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

</Switch>

</BrowserRouter>

);

}

**Example in React Router v6 (with Routes):**

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

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>

);

}