

➤ **THEROY ASSIGMNET** React Router

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

What is React Router?

React Router is a popular **routing library for React applications**. It enables navigation between different **views or pages** in a **single-page application (SPA)** without reloading the entire page.

How it works in SPAs:

- In a traditional multi-page application, each page change sends a new HTTP request to the server, and the browser reloads the page.
- In a **SPA**, React Router **intercepts the navigation events** and **updates the URL** without sending a new request to the server.
- Based on the updated URL, React Router **renders the correct component dynamically** in the **same page**, ensuring smooth transitions.

For example:

If you have different “pages” like /home, /about, and /contact, React Router renders the correct React component for each path **without reloading the page**.

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

Let's look at each one:

❖ **<BrowserRouter>**

- It is the **parent router component** that uses the **HTML5 history API** to keep your UI in sync with the URL.
- Wraps your entire app and **enables routing**.

➤ **Example:**

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

```
<BrowserRouter>
```

```
  { /* Your app routes here */ }
```

```
</BrowserRouter>
```

❖ **<Route>**

- Defines the **mapping** between a **URL path** and a **React component** to render.

❖ **Example:**

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

This means:

When the URL is /about, show the <About /> component.

❖ **<Link>**

- A React component for **navigation** within your app.
- It creates an <a> tag under the hood, but **prevents full page reload**.
- Example:

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

When clicked, the URL changes to /about and the corresponding component is rendered dynamically.

❖ **<Switch>** (in React Router v5)

- Ensures **only the first matched <Route>** inside the <Switch> renders.
- In newer React Router versions (v6+), it has been **replaced with <Routes>**.
- Example in v5:

```
<Switch>
```

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

```
  <Route path="/contact" component={Contact} />
```

```
</Switch>
```

This prevents multiple components from rendering if multiple paths match.

In summary:

Component	Purpose
<BrowserRouter>	Sets up the routing context for your app.
<Route>	Maps a path to a specific React component.
<Link>	Creates navigation links within your app.
<Switch>	Renders only the first matched route (v5).