

Assignment: Routing in React

1. **Basic Routing:** Create a React application with three routes:
 - "/" - Home page
 - "/about" - About page
 - "/contact" - Contact page Each page should display a simple message indicating the page's name.
2. **Nested Routing:** Extend the previous application to include nested routing:
 - "/" should display the Home page with links to nested routes.
 - "/products" - Products page with links to individual product pages.
 - "/products/:id" - Individual product pages with dynamic routing based on product ID. Implement a simple navigation bar for navigating between different routes.
3. **Login Routing:**
 - Create a login page with a form containing username and password fields.
 - Upon successful login, redirect the user to a dashboard page.
 - The dashboard page should be a protected route accessible only after successful authentication.
 - Implement a basic authentication mechanism (you can use local storage for simplicity).
4. **404 Handling:** Handle 404 errors gracefully:
 - Create a custom 404 page to be displayed when a user navigates to a non-existent route.
 - Ensure that any invalid URL navigations are redirected to the custom 404 page.
5. **Programmatic Navigation:** Implement programmatic navigation:
 - Create a page with a button.
 - On clicking the button, programmatically navigate the user to a different route (e.g., from "/page1" to "/page2").