

Experiment 2

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Branch: BE CSE

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Subject Name: Full Stack Development

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Aim:

To implement Single Page Application (SPA) navigation in the EcoTrack application using React Router, secure application routes using context-based authentication, and extend nested dashboard routing through follow-up enhancements.

Objective:

After completing this experiment and its follow-up tasks, the students will be able to:

- Configure client-side routing in a React application using React Router
- Implement SPA navigation without full page reloads
- Design and apply protected routes using route-guard patterns
- Manage shared authentication state using React Context API
- Implement nested routing to build dashboard-style layouts
- Extend existing nested routes by adding new dashboard sections
- Implement logout functionality by updating shared context state
- Analyze route access behavior and explain redirection logic
- Understand the role of Context API in shared state management and its comparison with Redux at an introductory level

Implementation/Code:

Dashboard.jsx:

```
import { logs } from "../data/logs"; import { Link,  
useNavigate } from "react-router-dom"; import {  
useAuth } from "../context/AuthContext";
```

```
const Dashboard = () => {
```

```
const totalCarbon = logs.reduce((total, log) => total + log.carbon, 0); const
```

```
highCarbonActivities = logs.filter(log => log.carbon > 4);
```

```
const lowCarbonActivities = logs.filter(log => log.carbon <= 4);
```

```
const { logout } = useAuth();  
const navigate = useNavigate();
```

```
const handleLogout = () => {  
  logout();  
  navigate("/login");  
};
```

```
return (  
  <div>  
    <h2 style={{ color: "green" }}>Dashboard</h2>  
  
    <nav>  
      <Link style={{ color: "blue", marginRight: "10px" }} to="/overview">  
Overview  
      </Link>  
      <Link style={{ color: "blue", marginRight: "10px" }} to="/reports">  
Reports  
      </Link>  
      <button  
        onClick={handleLogout}  
        style={{ color: "red", marginLeft: "10px" }}  
      >  
        Logout  
      </button>  
    </nav>  
  
    <p style={{ color: "purple" }}>  
      Total Carbon Footprint: {totalCarbon} Kg  
    </p>  
  
    <h3>All Activities</h3>
```

```

<ul>
  {logs.map(log => (
<li key={log.id}>
    {log.activity}: {log.carbon} Kg
  </li>
  )})
</ul>

<h3 style={{ color: "red" }}>High Carbon Activities (> 4 Kg)</h3>
<ul>
  {highCarbonActivities.map(log => (
    <li key={log.id}>
      {log.activity}: {log.carbon} Kg
    </li>
  )})
</ul>

<h3 style={{ color: "green" }}>Low Carbon Activities (≤ 4 Kg)</h3>
<ul>
  {lowCarbonActivities.map(log => (
    <li key={log.id}>
      {log.activity}: {log.carbon} Kg
    </li>
  )})
</ul>
</div>
);
};

```

export default Dashboard;

Login.jsx: import { useAuth } from
 "../context/AuthContext";
 import { useNavigate } from "react-router-dom";

```

const Login = () => {  const
  { login } = useAuth();
  const navigate = useNavigate();

```

```
const handleLogin = () => {  
  login();  
  navigate("/dashboard");  
};  
return (  
  <div>  
    <h2>Login</h2>  
    <button onClick={handleLogin}>Login to EcoTrack</button>  
  </div>  
);  
};  
  
export default Login;
```

ProtectedRoute.jsx: import { Navigate } from
"react-router-dom"; import { useAuth } from
"../context/AuthContext";

```
const ProtectedRoute = ({ children }) => {  
  const { isAuthenticated } = useAuth();  
  
  return isAuthenticated ? children : <Navigate to="/login" />;  
};  
  
export default ProtectedRoute;
```

Output:

Dashboard

Overview Reports

Logout

Total Carbon Footprint: 10 Kg

All Activities

- Car Travel: 4 Kg
- Electricity Usage: 6 Kg
- Cycling: 0 Kg

High Carbon Activities (> 4 Kg)

- Electricity Usage: 6 Kg

Low Carbon Activities (\leq 4 Kg)

- Car Travel: 4 Kg
- Cycling: 0 Kg

Login

Login to EcoTrack

Reports Page

This is the Analytics page of EcoTrack.

Overview Page

This is the Overview page of EcoTrack.

Learning Outcome:

- Implement SPA navigation in React using React Router without full page reloads.
- Design and apply protected routes using authentication state with Context API.



- Manage shared authentication state and implement login/logout functionality.
- Build and extend nested dashboard routes for modular layouts.
- Filter, display, and analyze data dynamically while understanding route access behavior.