

## 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;
```

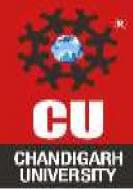
**ProtectedRoute.jsx:** import { Navigate } from "react-router-dom"; import { useAuth } from "../context/AuthContext";

```
const ProtectedRoute = ({ children }) => {
  const { isAuthenticated } = useAuth();

  return isAuthenticated ? children : <Navigate to="/login" />;
};

export default ProtectedRoute;
```

**Output:**



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## 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.



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- 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.