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Experiment 2

Student Name: Ayush Rana **UID: 23BCS10602**
Branch: BE CSE **Section/Group: KRG 3A**
Semester: 6th **Date of Performance: 19/01/26**
Subject Name: Full Stack Development **Subject Code: 23CSH-309**

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 (&gt; 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:

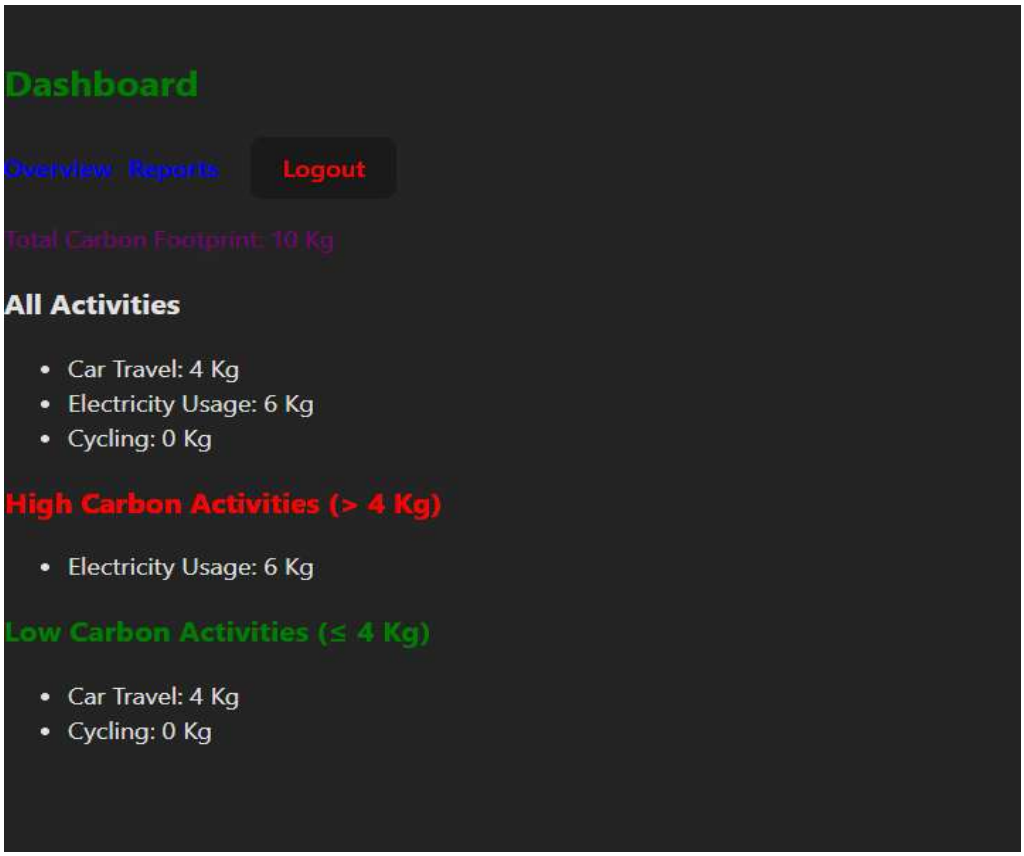
```
import { useAuth } from "../context/AuthContext";
import { useNavigate } from "react-router-dom";

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

  const handleLogin = () => {
    login();
    navigate("/dashboard");
  };
  return (
    <div>
      <h2>Login</h2>
```

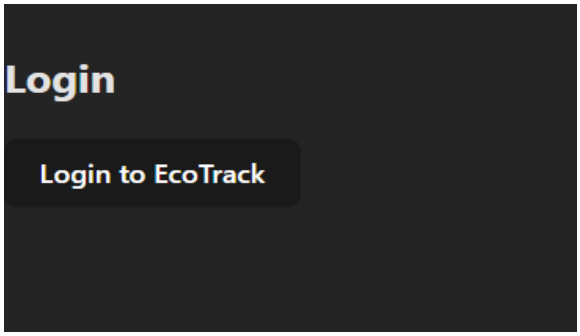
```
    <button onClick={handleLogin}>Login to EcoTrack</button>
   </div>
  );
};

export default Login;
```

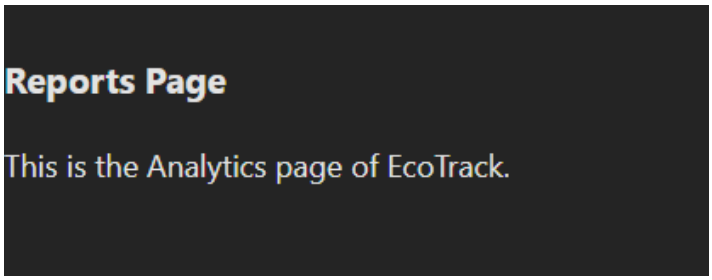
ProtectedRoute.jsx:

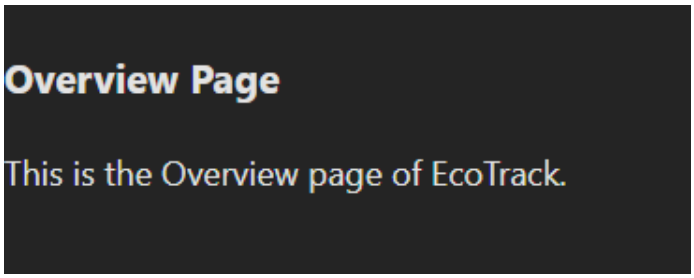
```
import { Navigate } from "react-router-dom";
import { useAuth } from "../context/AuthContext";

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

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

export default ProtectedRoute;
```

Output:









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.