



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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Experiment 2

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Semester: 6th
Subject Name: Full Stack

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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 student will be able to:

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

Implementation/Code:

Header.js:

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

const Header = () => {
  const { isAuthenticated } = useAuth();

  return (
    <header style={styles.header}>
```

```

<div style={styles.logo}>  EcoTrack</div>

<nav style={styles.nav}>
  {isAuthenticated && (
    <>
      <Link to="/">Dashboard</Link>
      <Link to="/logs">Logs</Link>
    </>
  )}
  {!isAuthenticated && <Link to="/login">Login</Link>}
</nav>
</header>
);
};

```

export default Header;

```

const styles = {
  header: {
    height: "64px",
    backgroundColor: "var(--surface)",
    display: "flex",
    alignItems: "center",
    justifyContent: "space-between",
    padding: "0 24px",
    borderBottom: "1px solid #1f2937"
  },
  logo: {
    fontSize: "20px",
    fontWeight: "700",
    color: "var(--primary)"
  },
  nav: {
    display: "flex",
    gap: "20px"
  }
};

```

AuthContext.js:

```

import { createContext, useContext, useState } from "react";

const AuthContext = createContext(null);

```

```

export const AuthProvider = ({ children }) => {
  const [isAuthenticated, setIsAuthenticated] = useState(false);

  const login = () => {
    setIsAuthenticated(true);
  };

  const logout = () => {
    setIsAuthenticated(false);
  };

  return (
    <AuthContext.Provider
      value={ {
        isAuthenticated,
        login,
        logout
      } }
    >
      {children}
    </AuthContext.Provider>
  );
};

```

```
export const useAuth = () => useContext(AuthContext);
```

Dashboard.js:

```

const DashboardSummary = () => (
  <>
    <h2>Carbon Summary</h2>
    <p style={ { color: "var(--muted)" } }>
      Overview of your environmental impact.
    </p>
  </>
);

```

```
export default DashboardSummary;
```

DashboardAnalytics.js:

```

const DashboardAnalytics = () => {
  return (
    <p>This is Dashboard Analytics</p>
  );
}

```

```
)  
};  
export default DashboardAnalytics;
```

DashboardSummary.js:

```
const DashboardSettings = () => {  
  return (  
    <h3 style={{color: "skyblue"}}>These are the settings</h3>  
  )  
}  
export default DashboardSettings;
```

DashboardLayout.js:

```
import { Link, Outlet } from "react-router-dom";  
import Logout from "./Logout";  
  
const DashboardLayout = () => {  
  return (  
    <div style={styles.container}>  
      <aside style={styles.sidebar}>  
        <h3 style={styles.sideTitle}>Dashboard</h3>  
        <Link to="summary">Summary</Link>  
        <Link to="analytics">Analytics</Link>  
        <Link to="settings">Settings</Link>  
      </aside>  
  
      <main style={styles.main}>  
        <Outlet />  
        <Logout />  
      </main>  
    </div>  
  );  
};  
export default DashboardLayout;  
  
const styles = {  
  container: {  
    display: "grid",  
    gridTemplateColumns: "220px 1fr",  
    minHeight: "calc(100vh - 64px)"  
  },
```

```
sidebar: {
  backgroundColor: "var(--surface)",
  padding: "20px",
  display: "flex",
  flexDirection: "column",
  gap: "12px",
  borderRight: "1px solid #1f2937"
},
sideTitle: {
  color: "var(--accent)",
  marginBottom: "10px"
},
main: {
  padding: "32px"
}
};
```

Login.js:

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

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

  const handleLogin = () => {
    login();
    navigate("/");
  };

  return (
    <div style={styles.wrapper}>
      <div style={styles.card}>
        <h2>Welcome to EcoTrack</h2>
        <p style={{ color: "var(--muted)" }}>
          Track and reduce your carbon footprint.
        </p>
        <button onClick={handleLogin}>Login</button>
      </div>
    </div>
  );
}
```

```
};

export default Login;

const styles = {
  wrapper: {
    minHeight: "calc(100vh - 64px)",
    display: "flex",
    alignItems: "center",
    justifyContent: "center"
  },
  card: {
    backgroundColor: "var(--surface)",
    padding: "32px",
    borderRadius: "14px",
    width: "320px",
    textAlign: "center"
  }
};


```

Logout.js:

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

const Logout = () => {
  const { logout } = useAuth();
  const navigate = useNavigate();

  const handleLogout = () => {
    logout();
    navigate("/login", { replace: true });
  };

  return (
    <button onClick={handleLogout}>
      Logout
    </button>
  );
}
```

```
};
```

```
export default Logout;
```

ViewLogs.js:

```
import logs from "../data/logs";  
  
const Viewlogs = () => {  
  return (  
    <div>  
      <h2>Experiment Logs</h2>  
      <ul>  
        {logs.map((log, index) => (  
          <li key={log.id}>  
            {log.activity}: {log.carbon} kg CO2  
          </li>  
        ))}  
      </ul>  
    </div>  
  )  
}  
export default Viewlogs;
```

ProtectedRoute.js:

```
import { Navigate } from "react-router-dom";  
import { useAuth } from "../context/AuthContext";  
  
const ProtectedRoute = ({ children }) => {  
  const { isAuthenticated } = useAuth();  
  return isAuthenticated ? children : <Navigate to="/login" replace />;  
};  
  
export default ProtectedRoute;
```

App.js:

```
import { Routes, Route } from "react-router-dom";  
  
import Header from "./components/Header";  
import Login from "./pages/Login";  
import Logs from "./pages/logs";
```

```

import DashboardLayout from "./pages/DashboardLayout";
import DashboardSummary from "./pages/DashboardSummary";
import DashboardSettings from "./pages/DashboardSettings";
import DashboardAnalytics from "./pages/DashboardAnalytics";

import ProtectedRoute from "./routes/ProtectedRoute";

function App() {
  return (
    <>
    <Header />

    <Routes>
      <Route path="/login" element={<Login />} />

      <Route
        path="/"
        element={
          <ProtectedRoute>
            <DashboardLayout />
          </ProtectedRoute>
        }
      >
        <Route index element={<DashboardSummary />} />
        <Route path="summary" element={<DashboardSummary />} />
        <Route path="settings" element={<DashboardSettings />} />
        <Route path="analytics" element={<DashboardAnalytics />} />
      </Route>

      <Route
        path="/logs"
        element={
          <ProtectedRoute>
            <Logs />
          </ProtectedRoute>
        }
      >
      </Routes>
    </>
  );
}

export default App;

```

Output:

Welcome to EcoTrack

Track and reduce your carbon footprint.

[Login](#)

Activity Logs

Car Travel	4 kg CO ₂
Electricity Usage	6 kg CO ₂
Cycling	0 kg CO ₂
Public Transport	12 kg CO ₂
Meat Consumption	5 kg CO ₂
Plant-based Meal	2 kg CO ₂
Air Travel	1 kg CO ₂

Total Emissions: 30 kg CO₂

Dashboard

[Summary](#)
[Analytics](#)
[Settings](#)

Carbon Summary

Overview of your environmental impact.

[Logout](#)

Learning Outcome

- 10.Learnt about react files.**
- 11.Learnt Design and apply protected routes using route-guard patterns.**
- 12.Learnt Implement nested routing to build dashboard-style layouts.**