



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Discover. Learn. Empower.

Experiment 2

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Semester: 6th Subject Name:

Full Stack

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Section: 23AIT KRG 1(G2)

Date of Performance: 22/01/26

Subject Code: 23CSH-382

1. 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.

2. 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.

3. Implementation/Code:

Header.js:

```
import {Link} from "react-router-dom";
```

```
const Header = ({ title }) => {
  return (
    <header style={{ padding:"1rem",
```

```

        backgroundColor:"#27ae60",
        color:"white",
        textAlign:"center",
    }}>
    <h2>{title}</h2>
    <nav>
        <Link to="/" style={{marginRight:"1rem",color:"#79e44f"}}>
            Dashboard
        </Link>
        <Link to="/logs"
style={{marginRight:"1rem",color:"#79e44f"}}>
            Logs
        </Link>
        <Link to="/login"
style={{marginRight:"1rem",color:"#79e44f"}}>
            Login
        </Link>

        <Link to="/logout"
style={{marginRight:"1rem",color:"#79e44f"}}>
            Logout
        </Link>
    </nav>
</header>
);
};

exportdefault Header;

```

AuthContext.js:

```

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

const AuthContext = createContext(null);

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

```

```
        return(
          <AuthContext.Provider value = {{ isAuthenticated,
            setIsAuthenticated}}>
            {children}
          </AuthContext.Provider>
        )
      }

exportconst useAuth = () => useContext(AuthContext);
```

logs.js:

```
export const logs = [
  { id: 1, activity: "Car Travel", carbon: 4 },
  { id: 2, activity: "Electricity Usage", carbon: 6 },
  { id: 3, activity: "Cycling", carbon: 0 },
  { id: 4, activity: "Bus Travel", carbon: 3 },
  { id: 5, activity: "Solar Energy Usage", carbon: 1 },
  { id: 6, activity: "Flight Travel", carbon: 8 },
];
```

```
export default logs;
```

Dashboard.js:

```
import logs from './data/logs'
import Header from './components/header'
const totalCarbon = logs.reduce ((sum, log) => sum+log.carbon,0)

const Dashboard = () => {
  return (
    <div >
      <h2>{Header}</h2>
      <p style={{padding
        :"1rem",backgroundColor:"#3175a2",color:"#d6eaf8",textAlign:"cente
        r"{}>Total Carbon Footprint:{totalCarbon}</p>

      <ul style={{padding
        :"1rem",backgroundColor:"white",color:"#111",textAlign:"center"{}>
        {logs.map((log)=>
```

```
        <li key={log.id}>
          {log.activity}:{log.carbon} kgs
        </li>
      )})
</ul>
</div>

)
}

export default Dashboard;
```

DashboardAnalytics.js:

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

export default DashboardAnalytics;
```

DashboardSummary.js:

```
const DashboardSummary = ()=>{
  return (<p>This is Dashboard Summary</p>)
}

export default DashboardSummary;
```

DashboardLayout.js:

```
import { Link, Outlet } from "react-router-dom";
const DashboardLayout = ()=>{

  return (
    <div style={{padding:"1rem"}}>
      <h3>Dashboard</h3>

      <nav>
        <Link to="/summary">Summary</Link> |{" "}
        <Link to="/analytics">Analytics</Link>
      </nav>
      <hr/>
    </div>
  )
};

export default DashboardLayout;
```

```
<Outlet/>

</div>

)
};

export default DashboardLayout;
```

Login.js:

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

constLogin =()=>{
    const{setIsAuthenticated}=useAuth();
    constnavigate = useNavigate();

    consthandleLogin=() => {
        setIsAuthenticated(true);
        navigate("/");
    };

    return (
        <divstyle={{padding:"1rem"}}>
            <h3>Login Page</h3>
            <button onClick={handleLogin}>Login</button>
        </div>
    )
}

exportdefault Login;
```

Logout.js:

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

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

```
const handleLogout = () => {
  setIsAuthenticated(false);
  navigate("/");
};

return (
  <div style={{padding: "1rem"}}>
    <h3>Logout Page</h3>
    <button onClick={handleLogout}>Logout</button>
  </div>
)
}
```

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();
```

```

if(!isAuthenticated){
    return <Navigate to="/login" replace/>
}

return children;
}

export default ProtectedRoute;

```

App.js:

```

importHeader from "./components/header";

import{BrowserRouter,Routes,Route } from "react-router-dom";
importLogin from "./pages/login";
importViewlogs from "./pages/Viewlogs";
importDashboardLayout from "./pages/DashboardLayout";
importDashboardAnalytics from "./pages/DashboardAnalytics";
importDashboardSummary from "./pages/DashboardSummary";
importProtectedRoute from "./routes/ProtectedRoutes";
importLogout from "./pages/logout";

functionApp (){
    return (
        <BrowserRouter>
            <Header title="Eco Track : Experiment 2 "/>
            <Routes>
                <Route path= "login" element={<Login/>}/>
                <Route path= "/" element=
                {
                    <ProtectedRoute>
                        <DashboardLayout />
                    </ProtectedRoute>
                }>

                <Route index />
                <Route path="Summary" element={<DashboardSummary/>}/>
                <Route path="Analytics" element={<DashboardAnalytics/>}/>
                <Route path="logs" element={<Viewlogs/>}/>
            </Routes>
        </BrowserRouter>
    )
}

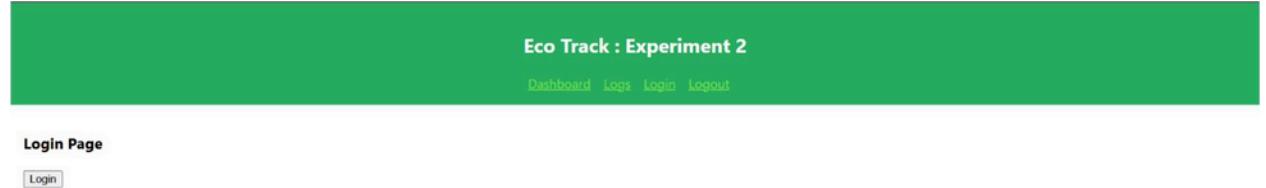
```

```
</Route>
</Routes>
<Routes>
  <Route path="logout" element={<Logout/>}/>
</Routes>

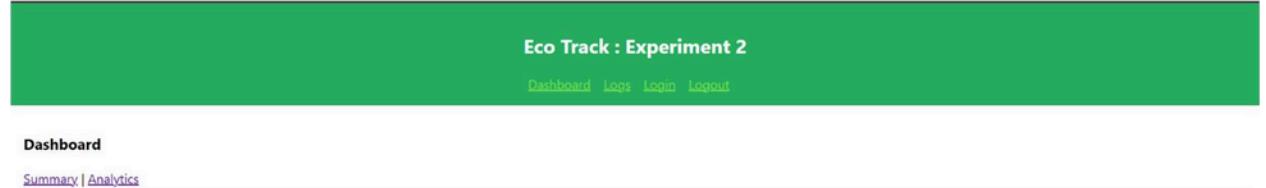
</BrowserRouter>
)
}
export default App;
```

4. Output:

Login page:



Dashboard Page:



Dashboard Summary Page:

Eco Track : Experiment 2

[Dashboard](#) [Logs](#) [Login](#) [Logout](#)

Dashboard

[Summary](#) | [Analytics](#)

This is Dashboard Summary

localhost:3000/summary

Logs Page:

Eco Track : Experiment 2

[Dashboard](#) [Logs](#) [Login](#) [Logout](#)

Dashboard

[Summary](#) | [Analytics](#)

Experiment Logs

- Car Travel: 4 kg CO₂
- Electricity Usage: 6 kg CO₂
- Cycling: 0 kg CO₂
- Bus Travel: 3 kg CO₂
- Solar Energy Usage: 1 kg CO₂
- Flight Travel: 8 kg CO₂

Logout Page:

Eco Track : Experiment 2

[Dashboard](#) [Logs](#) [Login](#) [Logout](#)

Logout Page

5. Learning Outcome

1. Learnt about react files.
2. Learnt Design and apply protected routes using route-guard patterns.
3. Learnt Implement nested routing to build dashboard-style layouts.