



# DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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## Experiment 3

**Student Name:** Shubham Kumar

**UID:** 23BCS13887

**Branch:** BE CSE

**Section/Group:** KRG\_3B

**Semester:** 6<sup>th</sup>

**Date of Performance:** 06/02/26

**Subject Name:** Full Stack - II

**Subject Code:** 23CSH-309

**Aim:** To develop a secure navigation system using Context-based authentication, protected routing, and optimized React hooks to improve performance and UI using Material UI..

### Objective:

- To manage **user authentication state globally** using Context
- To implement **routing for page navigation**
- To restrict access to protected routes for unauthenticated users
- To allow page switching **only after successful login**
- To redirect unauthenticated users automatically to the **login page**
- To improve application security and user experience
- To maintain clean, scalable, and reusable code structure

### Input/Apparatus Used:

- Programming Language: JavaScript (ES6+)
- Framework / Library: React (Functional Components)
- Build Tool: Vite
- Code Editor: Visual Studio Code
- Web Browser: Google Chrome

### Tools & Tech Used

- **React (Functional Components)**
- **React Router DOM**
- **Context API**
- **Optimized Hooks: React.memo, useMemo, useCallback**
- **Material UI (MUI)**



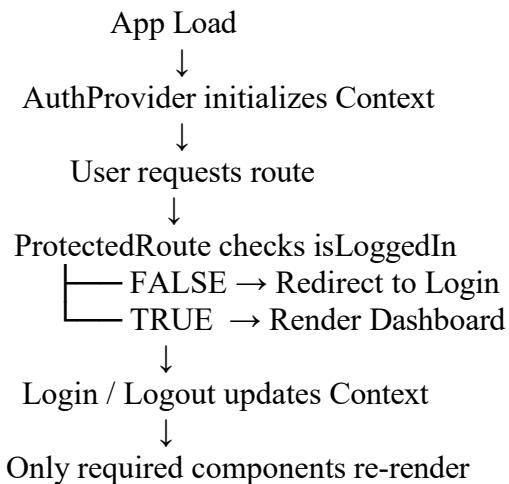
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## File Structure

```
src/
  └── main.jsx
  └── App.jsx
  └── context/
    └── AuthContext.jsx
  └── components/
    ├── Login.jsx
    └── Dashboard.jsx
      └── ProtectedRoute.jsx
```

## Flow of data



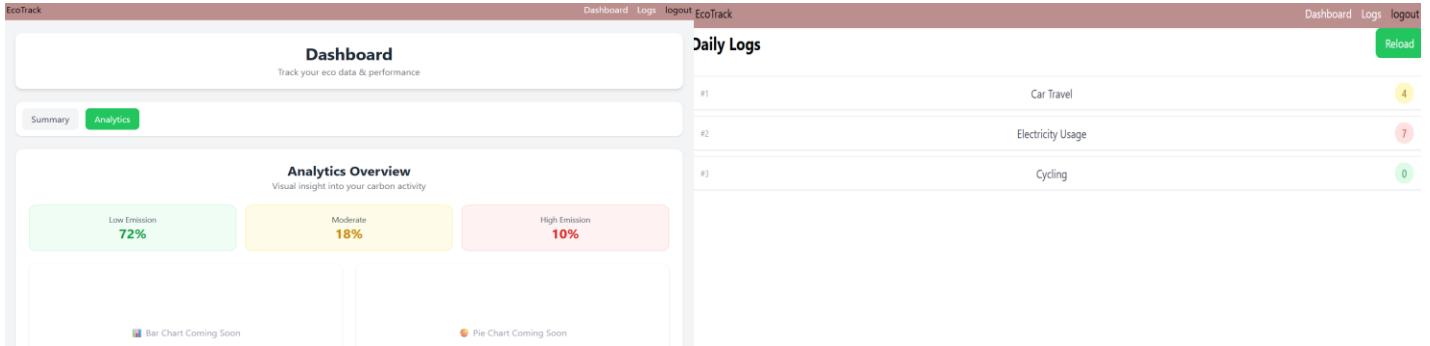
## Output:

The screenshot shows two views of the EcoTrack application. On the left, the login screen displays the 'EcoTrack' logo and the tagline 'Track and reduce your carbon footprint.' Below the tagline is a green 'Login' button and a note 'Demo login (no password required)'. At the bottom of the page, there is a footer bar with links for 'Dashboard', 'Logs', and 'Login'. On the right, the dashboard view is shown. It features a header with the 'EcoTrack' logo and navigation links for 'Dashboard', 'Logs', and 'logout'. The main dashboard area has a title 'Dashboard' and a subtitle 'Track your eco data & performance'. Below this are two tabs: 'Summary' and 'Analytics'. Under the 'Summary' tab, there is a section titled 'Summary Overview' with four cards: 'Total Logs' (13), 'Low Emission' (7), 'High Emission' (6), and 'Total Carbon' (51). The overall interface is clean and modern, using a light color palette and clear typography.



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## Learning Outcomes

- Learned performance optimization using React.memo, useMemo, and useCallback
- Implemented secure routing with Context API
- Reduced unnecessary re-renders
- Built modern UI using Material UI
- Improved scalability and maintainability