Experiment 4

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Section/Group: KRG_3B
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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)**

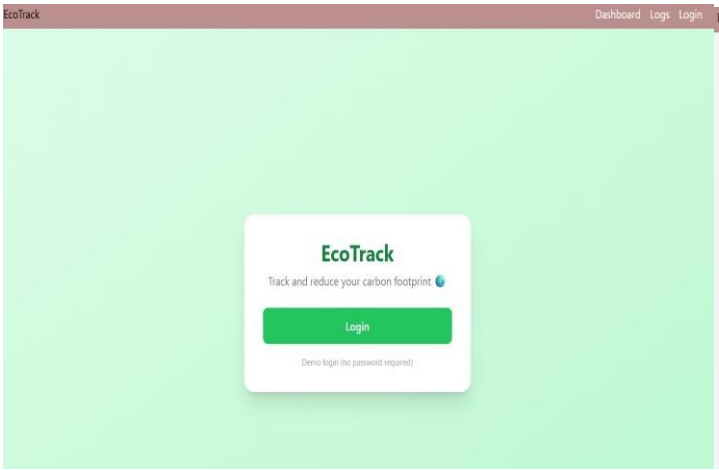
File Structure

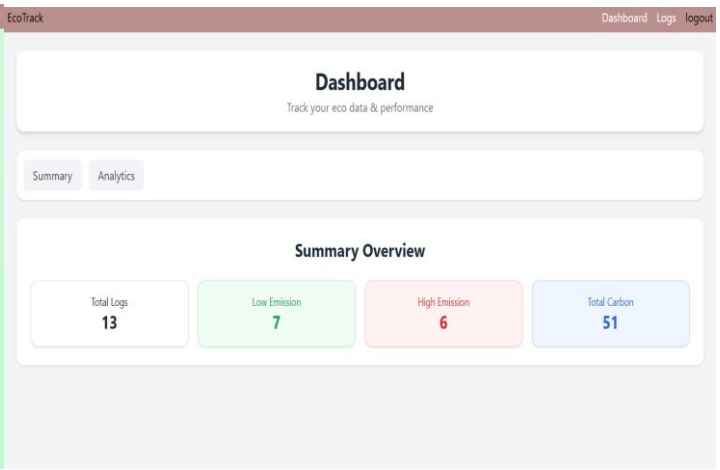
```
src/
├── main.jsx
├── App.jsx
├── context/
│   └── AuthContext.jsx
├── components/
│   ├── Login.jsx
│   ├── Dashboard.jsx
│   └── ProtectedRoute.jsx
```

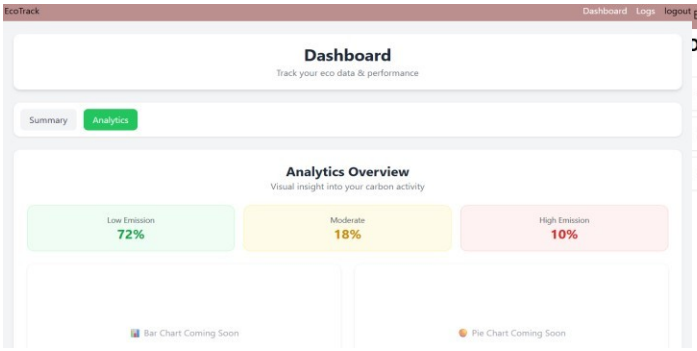
Flow of data

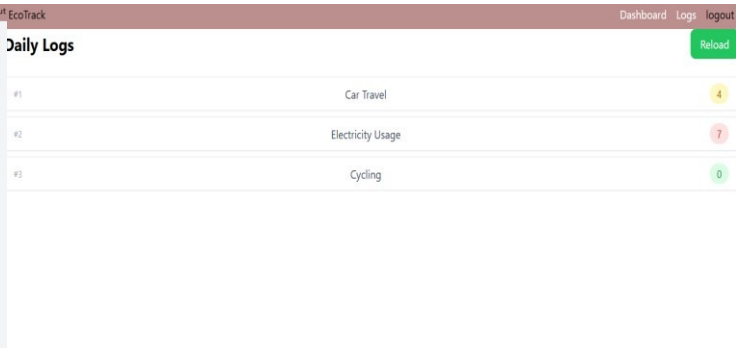
App Load
↓
AuthProvider initializes Context
↓
User requests route
↓
ProtectedRoute checks isLoggedIn
├── FALSE → Redirect to Login
└── TRUE → Render Dashboard
↓
Login / Logout updates Context
↓
Only required components re-render

Output:









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