Experiment - 2

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Branch : BE CSE (AIML)   **Section/Group :** 23AIT-KRG/G1

Semester : 6th SEM   **Date of Performance : 23**/01/26

Subject Name : Full Stack II   **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 :**
   - Configure client-side routing in a React APP 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.

3. **Implementation/Code :**
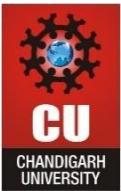
   AuthContext.jsx :

```jsx
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>
    )
}

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

ProtectedRoute.jsx :

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

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

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

export default ProtectedRoute;
```
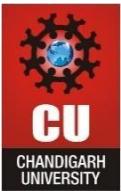
Logs.jsx :

```jsx
const Logs = ({ logs }) => {
  const filteredArray = logs.filter((log) => {
    if (log.carbon >= 4) {
      return log;
    }
  });
  const Array = logs.filter((log) => {
    if (log.carbon < 4) {
      return log;
    }
  });
  return (
    <ul>
      <h2>High Carbon Activity</h2>
      {filteredArray.map((log) => (
        <li style={{ color: "red" }} key={log.id}>
          {log.activity} = {log.carbon} Kg
        </li>
      ))}
      <h2>Low Carbon Activity</h2>
      {Array.map((log) => (
        <li style={{ color: "green" }} key={log.id}>
          {log.activity} = {log.carbon} Kg
        </li>
      ))}
    </ul>
  );
};

export default Logs;
```

Login.jsx :

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

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

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


    return (
        <>
        <h3>Login</h3>
        <button onClick={handleLogin}>Login</button>
        </>
    )
}
export default Login;
```

Logout.jsx :

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

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

  useEffect(() => {
    setIsAuthenticated(false);
  }, [setIsAuthenticated]);

  return (
    <div style={{ textAlign: "center", padding: "2rem" }}>
      <h3>You have been logged out successfully</h3>
      <p>Thank you for using EcoTrack!</p>
      <Link to="/login" style={{ color: "#27ae60", textDecoration: "underline" }}>
        Go back to Login
      </Link>
    </div>
  );
};

export default Logout;
```

DashboardSummary :
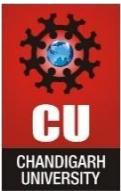
```jsx
const DashboardSummary = () => {
    return (
        <p>This is a Dashboard Summary</p>
    )
}
export default DashboardSummary;
```

DashboardAnalytics :

```jsx
const DashboardAnalytics = () => {
  return (
    <div>DashboardAnalytics</div>
  )
}

export default DashboardAnalytics
```

DashboardLayout.jsx :

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

const DashboardLayout = () => {
  return (
    <>
      <h3>Dashboard</h3>
      <nav style={{ display: "flex", gap: "1rem", marginBottom: "1rem" }}>
        <Link to="/summary">Summary</Link>
        <Link to="/analytics">Analytics</Link>
        <Link to="/logs">Logs</Link>
      </nav>
      <hr />
      <Outlet />
    </>
  );
};

export default DashboardLayout;
```

Header.jsx :

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

const Header = ({ title }) => {
  const { isAuthenticated } = useAuth();
  const navigate = useNavigate();

  const handleLogout = () => {
    navigate("/logout");
  };

  return (
    <header
      style={{
        padding: "1rem",
        backgroundColor: "#27ae60",
        textAlign: "center",
        display: "flex",
        justifyContent: "space-between",
        alignItems: "center",
      }}
    >
      <h1>{title || "EcoTrack"}</h1>
      {isAuthenticated && (
        <button
          onClick={handleLogout}
          style={{
            padding: "0.5rem 1rem",
            backgroundColor: "#e74c3c",
            color: "white",
            border: "none",
            borderRadius: "4px",
            cursor: "pointer",
          }}
        >
          Logout
        </button>
      )}
    </header>
  );
};

export default Header;
```

App.jsx :

```jsx
import DashboardAnalytics from "./pages/DashboardAnalytics";
import logs from "./data/logs";
import Logs from "./pages/Logs";
import DashboardLayout from "./pages/DashboardLayout";
import DashboardSummary from "./pages/DashboardSummary";
import ProtectedRoute from "./routes/ProtectedRoute.jsx";
import { BrowserRouter, Routes, Route } from "react-router-dom";
import Login from "./pages/login";
import Logout from "./pages/Logout";
import Header from "./components/Header";

function App() {
  return (
    <BrowserRouter>
      <Header title="EcoTrack" />
      <Routes>
        <Route path="/login" element={<Login />} />
        <Route path="/logout" element={<Logout />} />
        <Route
          path="/"
          element={
            <ProtectedRoute>
              <DashboardLayout />
            </ProtectedRoute>
          }
        >
          <Route index element={<DashboardSummary />} />
          <Route path="summary" element={<DashboardSummary />} />
          <Route path="analytics" element={<DashboardAnalytics />} />
          <Route path="logs" element={<Logs logs={logs} />} />
        </Route>
      </Routes>
    </BrowserRouter>
  );
}

export default App;
```

4. Output :

EcoTrack

Login

[Login]

EcoTrack   [Logout]
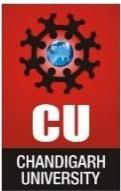
Dashboard

Summary   Analytics   Logs

This is a Dashboard Summary

5. Learning Outcomes :

- We learnt about React Apps and how to create them.
- We learnt about reduce function and how it replaces map and filter.
- We learnt about the use of hooks.
- We learnt about Authentication and index pages.
- We learnt the use of useContext and useState.
- We learnt about the flow of a React project.