



Experiment 2

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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.

Objectives

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

Code:

App.jsx

```
navigator > src > App.jsx > App
  1 import { BrowserRouter, Routes, Route } from "react-router"
  2 import Login from "./pages/Login"
  3 import ProtectedRoute from "./routes/ProtectedRoute"
  4 import DashboardLayout from "./pages/DashboardLayout"
  5 import DashboardSummary from "./pages/DashbaordSummary"
  6 import DashboardAnalytics from "./pages/DashboardAnalytics"
  7 import Logs from "./pages/Logs"
  8 import Header from "./components/Header"
  9
 10 function App() {
 11   return (
 12     <>
 13       <Header title = {"Carbon Footprint Navigator"} />
 14       <Routes>
 15         <Route path = "/login" element = {<Login />} />
 16         <Route
 17           path = "/" element = {
 18             <ProtectedRoute>
 19               <DashboardLayout />
 20             </ProtectedRoute>
 21           }
 22           <Route index element = {<DashboardSummary />} />
 23           <Route path = "summary" element = {<DashboardSummary />} />
 24           <Route path = "analytics" element = {<DashboardAnalytics />} />
 25           <Route path = "logs" element = {<Logs />} />
 26         </Route>
 27         <Route path = "logout" element = {<Login />} />
 28       </Routes>
 29     </>
 30   )
 31 }
 32
 33 export default App;
```

context and custom hooks in context->AuthContext

```
import { createContext, useContext, useState } from "react";
//Empty context global state variaable initially empty
const AuthContext = createContext(null);

//passing it to the children components
//what awe are passing isAuthenticated and setIsauthenticated
export const AuthProvider = ({children}) => {
    const [isAuthenticated, setIsAuthenticated] = useState(false);
//returning the provider
    return(
        <AuthContext.Provider value={

            {isAuthenticated, setIsAuthenticated}
        }>
            {children}
        </AuthContext.Provider>
    )
}

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

Routes->ProtectedRoutes:

navigator > src > routes > ✨ ProtectedRoute.jsx > ...

```
1 import { Navigate } from 'react-router-dom';
2 import { useAuth } from '../context/AuthContext';
3
4 const ProtectedRoute = ({children}) => {
5     const {isAuthenticated} = useAuth();
6     console.log(isAuthenticated);
7
8     if(!isAuthenticated){
9         return <Navigate to = '/login' replace/>
10    }
11    return children;
12 }
13 export default ProtectedRoute;
```

Components->Header.jsx

```
1 const Header = (props) =>{
2     const title = props.title;
3     return(
4         <header style = {{
5             padding:"1rem",
6             backgroundColor: "black",
7             borderBottom: "5px solid white",
8             color: "white",
9             textAlign: "center",
10            borderRadius: "0 0 10px 10px"
11        }}>
12         <h1>{title}</h1>
13         </header>
14     );
15 }
16
17 export default Header;
```

pages->dashBoardSummary

```
const DashboardSummary = () =>{
    return(
        <div style={{color: 'black',background: 'white',height: '500px',border:
        <h1>This is Dashboard Summary</h1>
        <p>In the process of making by Ms. Rathee</p>

        </div>
    )
}

export default DashboardSummary;
```

pages->dashBoardAnalytics

```
const DashboardAnalytics = () =>{
    return(
        <h1 style={{color: 'black',background: 'white',height: '500px',border:
        </h1>
    )
}

export default DashboardAnalytics;
```

dashBoardLayout.css

navigator > src > pages > # DashboardLayout.css > .dashboard-header

```
1 .dashboard-header{  
2     background-color: #rgb(59, 62, 62);  
3     backdrop-filter: blur(100px);  
4     padding: 1rem;  
5     width: 50%;  
6     margin-left: 390px;  
7     text-align: center;  
8     margin-top: 70px;  
9     color: white;  
10    border: 5px solid white;  
11    border-radius: 4px;  
12    box-shadow: 8px 8px 15px #rgba(0, 0, 0, 0.1);  
13 }  
14  
15 .dashboard-nav{  
16     background-color: #rgba(112, 128, 144, 0.7);  
17     backdrop-filter: blur(10px); /* This creates the frost  
18     border-radius: 15px;  
19     padding: 0.5rem;  
20     display: flex;  
21     justify-content: space-around;  
22     height: 80px;  
23     align-items: center;  
24  
25 }  
26  
27 .nav-link {  
28     color: white;  
29     text-decoration: none;  
30 }  
31 .nav-link:hover {  
32     text-decoration: underline;  
33 }  
34 .dashboard-content{  
35     padding: 2rem;  
36 }
```

dashBoardLayout.jsx

```
navigator > src > pages > DashboardLayout.jsx > ...
1 import {Link,Outlet} from 'react-router-dom';
2 import './DashBoardLayout.css';
3
4 const DashboardLayout = () => {
5     return(
6         <div className = "dashboard-container">
7             <div className="dashboard-header">
8                 <h1>Dashboard</h1>
9
10            <nav className="dashboard-nav">
11                <Link to="summary" className="nav-link"><h2>Summary</h2></Link>
12                <Link to='analytics' className="nav-link"><h2>Analytics</h2></Link>
13                <Link to='logs' className='nav-link'><h2>Logs</h2></Link>
14                <Link to='logout' className='nav-link'><h2>Logout</h2></Link>
15
16            </nav>
17
18        </div>
19
20
21        <div className="dashboard-content">
22            <outlet />
23        </div>
24
25    </div>
26 )
27 }
28 export default DashboardLayout;
```

Login.jsx

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

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

    const handleLogin = () => {
        console.log("login clicked");
        setIsAuthenticated(true);
        navigate("/");
    }

    return(
        <>
        <h1 style={
            {display: 'flex',
            alignSelf: 'center',
            color: 'white',
            backgroundColor: 'black',
            height: '100px',
            width: '200px',
            alignItems: 'center',
            justifyContent: 'center',
            border: '1px solid white',
            borderRadius: '10px',
            marginTop: '50px',
            marginLeft: '350px',
            boxShadow: '3px 4px 10px white'
            }
        >login</h1>
```

```
<button style={{
    padding: '10px 20px',
    fontSize: '25px',
    color: 'black',
    backgroundColor: 'white',
    marginLeft: '400px',
    marginTop: '20px',
    border: '2px solid grey',
    borderRadius: '5px',
    cursor: 'pointer',
    boxShadow: '3px 4px 10px black'
}} onClick={handleLogin}>Login</button>
</>
}
}

export default Login;
```

Logs.jsx

```

import logs from '../data/logs.js'
import { calculateTotalCarbon } from '../data/Calculation.js'

function Logs(){
  const totalCarbon = calculateTotalCarbon(logs);

  return(
    <div style={{color: 'black',background: 'white',height: '100%',border: '5px solid black',boxShadow: '0 8px 18px' }>
      <h1>Total Carbon Footprint: {totalCarbon}</h1>

      <h2>Activity Logs </h2>
      <table style={{flex: 1, border: "2px solid black", margin: "auto", textAlign: "center" }}>
        <thead>
          <tr>
            <th style={{border: "2px solid black"}}>Activity</th>
            <th style={{border: "2px solid black"}}>Carbon Footprints</th>
          </tr>
        </thead>

        <tbody>
          {logs.map((log)=>(
            <tr key = {log.id} style={{color : 'white', backgroundColor: 'blue'}}>
              <td>{log.activity}</td>
              <td>{log.carbon}kg</td>
            </tr>
          ))}
        </tbody>
      </table>
    
```

```

<h2 style={{marginTop: "100px"}>Filtered Logs less than equal to 4kg</h2>

<table style = {{flex: 1, border: "2px solid black", margin: "auto" }}>
  <thead>
    <tr>
      <th style={{border: "2px solid black", textAlign: "center" }}>Activity</th>
      <th style={{border: "2px solid black", textAlign: "center" }}>Carbon Footprints</th>
    </tr>
  </thead>
  <tbody>
    {
      logs.filter((log)=> log.carbon <= 4).map((log) =>(
        <tr key = {log.id} style={{color : 'white', backgroundColor: 'green'}}>
          <td>{log.activity}</td>
          <td>{log.carbon}kg</td>
        </tr>
      ))
    }
  </tbody>
</table>

```

```

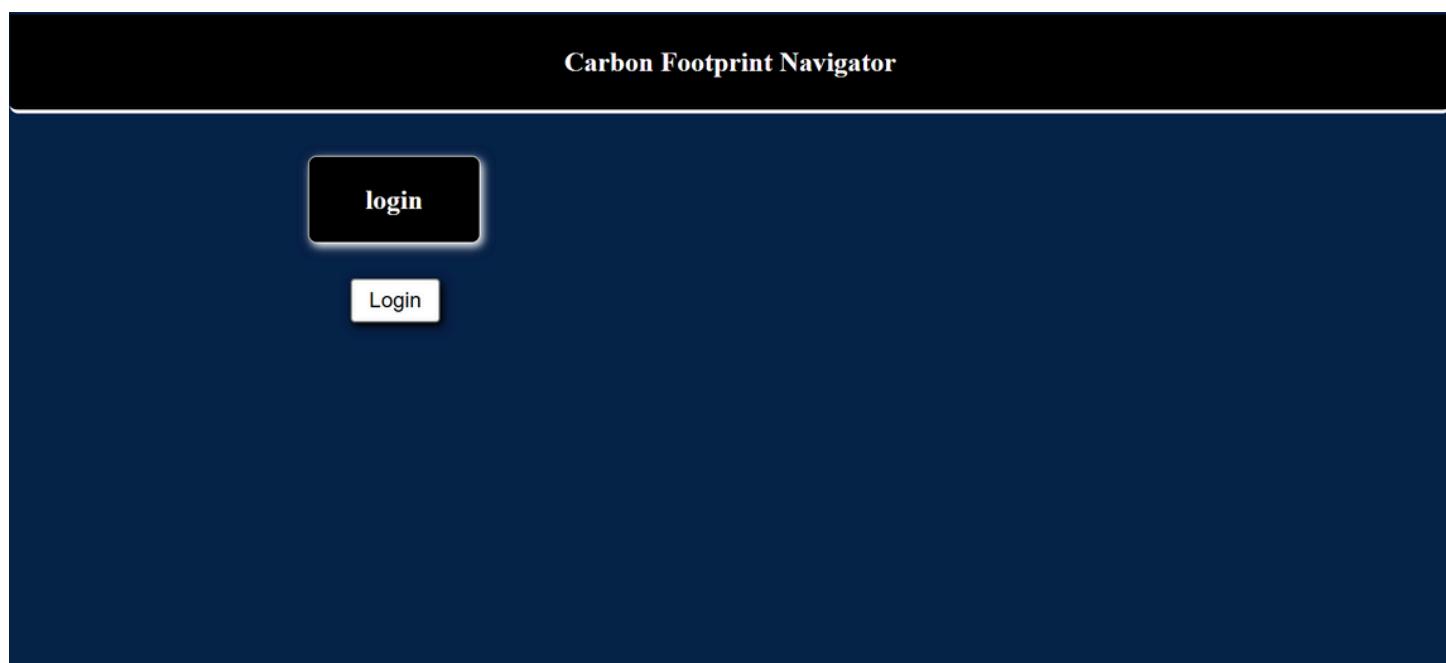
<h2 style={{marginTop: "100px"}}>Filtered Logs greater than 4kg</h2>
<table style = {{flex: 1, border: "2px solid black", margin: "auto"}}>
  <thead>
    <tr>
      <th style={{border: "2px solid black", textAlign: "center"}}>Activity</th>
      <th style={{border: "2px solid black", textAlign: "center"}}>Carbon Footprints</th>
    </tr>
  </thead>
  <tbody>
    {
      logs.filter((log)=> log.carbon > 4).map((log) =>(
        <tr key = {log.id} style={{color : 'white', backgroundColor: 'red'}}>
          <td>{log.activity}</td>
          <td>{log.carbon}kg</td>
        </tr>
      ))
    }
  </tbody>
</table>

</div>
)
}

export default Logs

```

Output:



Carbon Footprint Navigator

Dashboard

Summary

Analytics

Logs

Logout

This is Dashboard Summary

In the process of making by Ms. Rathee

Carbon Footprint Navigator

Dashboard

Summary

Analytics

Logs

Logout

This is Dashboard Analytics

Carbon Footprint Navigator

Dashboard

[Summary](#)

[Analytics](#)

[Logs](#)

[Logout](#)

Total Carbon Footprint: 10

Activity Logs

Activity	Carbon Footprints
Car Travel	4kg
Electricity Usage	6kg
Cycling	0kg

localhost:5173/logs

Total Carbon Footprint: 10

Activity Logs

Activity	Carbon Footprints
Car Travel	4kg
Electricity Usage	6kg
Cycling	0kg

Filtered Logs less than equal to 4kg

Activity	Carbon Footprints
Car Travel	4kg
Cycling	0kg

Filtered Logs greater than 4kg

Activity	Carbon Footprints
Electricity Usage	6kg

After logout back to login page

The screenshot shows a browser window with the URL "localhost:5173/logout" in the address bar. The main content area displays the "Carbon Footprint Navigator" logo at the top. Below it is a large black button with the word "login" in white. Underneath the button is a smaller, standard-looking "Login" button.

Learning Outcomes:

Learnt about SPA navigation without full page reloads

Learnt Nested Routing

Learnt how to use the inline css and the css from separate file