Experiment 1

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Subject Name: Full Stack Development – II **Subject Code: 23CSH-309**

1. **Aim**: To design and implement the foundational frontend architecture of the EcoTrack application using modern React practices, Vite tooling, and ES6+ JavaScript features.

2. Objective:

- To set up a React project using **Vite** with proper project structure
- To understand **component-based architecture** in React
- To apply **ES6 array methods** (map, filter, reduce) for data-driven UI rendering
- To separate concerns using **components, pages, and data modules**

3. Implementation / Code:

Tools & Technologies Used:

- React (Functional Components)
- Vite (Build Tool)
- JavaScript (ES6+)
- HTML & CSS
- Visual Studio Code

Implementation Description:

The EcoTrack application is implemented using React with Vite to ensure fast development and optimized build performance.
The application follows a component-based architecture, where data and UI logic are clearly separated.

A predefined list of activities with their respective carbon emission values is maintained. Using ES6 array methods:

- map() is used to display activity data on the UI

- filter() is used to classify activities into high and low carbon categories

- reduce() is used to calculate the total carbon emission

This structure improves code readability, reusability, and maintainability.

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Sample Code Snippet:

```js
JS logs.js

experiment-1-ecotrack > ecotrack > src > data > JS logs.js > ...
1    export const logs = [
2      { id: 1, activity: "Car Travel", carbon: 3 },
3      { id: 2, activity: "Electricity Usage", carbon: 6 },
4      { id: 3, activity: "Cycling", carbon: 0 },
5      { id: 4, activity: "Bus Travel", carbon: 2 },
6      { id: 5, activity: "Flight Travel", carbon: 12 },
7      { id: 6, activity: "Train Travel", carbon: 1 },
8      { id: 7, activity: "Air Conditioner Usage", carbon: 5 },
9      { id: 8, activity: "Solar Energy Usage", carbon: 0 },
10     { id: 9, activity: "Cooking with Gas", carbon: 4 },
11     { id: 10, activity: "LED Lighting", carbon: 1 },
12     { id: 11, activity: "Laptop Usage", carbon: 2 },
13     { id: 12, activity: "Meat Consumption", carbon: 7 },
14     { id: 13, activity: "Recycling Waste", carbon: 0 },
15   ]
16
```

```jsx
Dashboard.jsx

experiment-1-ecotrack > ecotrack > src > pages > Dashboard.jsx > ...
1    import { logs } from "../data/logs"
2
3    const Dashboard = () => {
4      const validLogs = logs.filter(log => log.carbon !== 0)
5
6      const totalEmission = validLogs.reduce(
7        (sum, log) => sum + log.carbon,
8        0
9      )
10
11     return (
12       <div className="section">
13         <h2 className="section-title">Carbon Dashboard</h2>
14         <hr />
15
16         {validLogs.map(log => (
17           <p key={log.id} className="item">
18             {log.activity}: <strong>{log.carbon} kg CO₂</strong>
19           </p>
20         ))}
21
22         <p className="total">
23           Total Emission: {totalEmission} kg CO₂
24         </p>
25       </div>
26     )
27   }
28
29   export default Dashboard
30
```
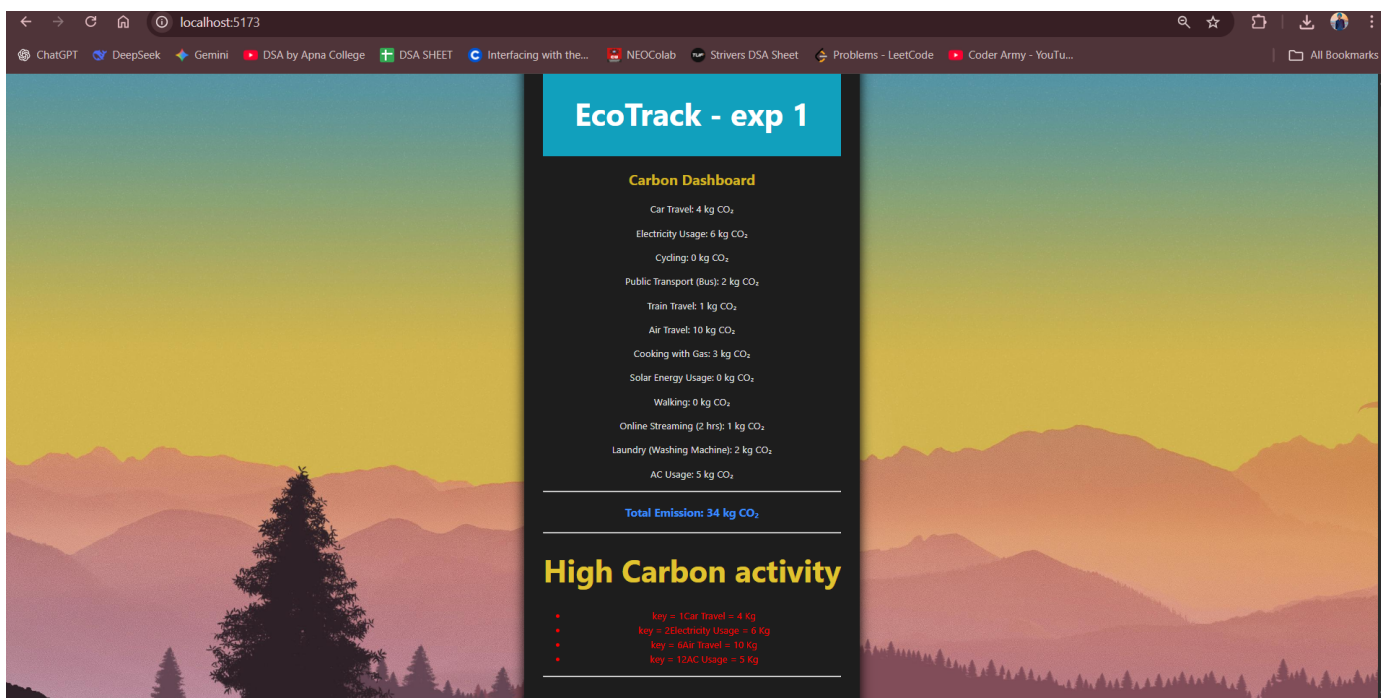
Logs.jsx ✕

experiment-1-ecotrack > ecotrack > src > pages > Logs.jsx > ...

```jsx
import { logs } from "../data/logs"

const Logs = () => {
  const validLogs = logs.filter(log => log.carbon !== 0)

  const highCarbon = validLogs.filter(log => log.carbon > 4)
  const lowCarbon = validLogs.filter(log => log.carbon < 4)

  return (
    <div className="section">

      <h3 className="section-subtitle">
        High Carbon Activities (&gt; 4 kg CO₂)
      </h3>
      <hr />

      {highCarbon.map(log => (
        <p key={log.id} className="item high-carbon">
          {log.activity}: {log.carbon} kg CO₂
        </p>
      ))}

      <h3 className="section-subtitle">
        Low Carbon Activities (&lt; 4 kg CO₂)
      </h3>
      <hr />

      {lowCarbon.map(log => (
        <p key={log.id} className="item low-carbon">
          {log.activity}: {log.carbon} kg CO₂
        </p>
      ))}
    </div>
  )
}

export default Logs
```

App.jsx ✕

experiment-1-ecotrack > ecotrack > src > App.jsx > ...

```jsx
import Dashboard from "./pages/Dashboard"
import Logs from "./pages/Logs"
import "./App.css"

function App() {
  return (
    <div className="app">
      <h1 className="app-title">ECOTRACK (Experiment 1)</h1>

      <div className="card">
        <Dashboard />
        <Logs />
      </div>
    </div>
  )
}

export default App
```

4. Output:

- The EcoTrack application displays a Carbon Dashboard
- Activities and their corresponding CO_2 emission values are rendered dynamically
- The total carbon emission is calculated using reduce()
- Activities are classified into:
  - High Carbon Activities
  - Low Carbon Activities
- The UI reflects proper separation of data and presentation logic
- (Output verified using the EcoTrack React application interface)

5. Learning Outcomes:

After completing this experiment, the student is able to:

- Set up a React project using **Vite**
- Understand and implement **component-based design**
- Use **ES6 array methods** for dynamic UI rendering
- Structure a React application using **separation of concerns**
- Build a foundational frontend architecture for a real-world application