



Experiment 1

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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 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
```

```
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}</strong> kg CO2</p>
19          ))}
20
21        <p className="total">
22          Total Emission: {totalEmission} kg CO2
23        </p>
24      </div>
25    )
26  }
27
28
29  export default Dashboard
30
```

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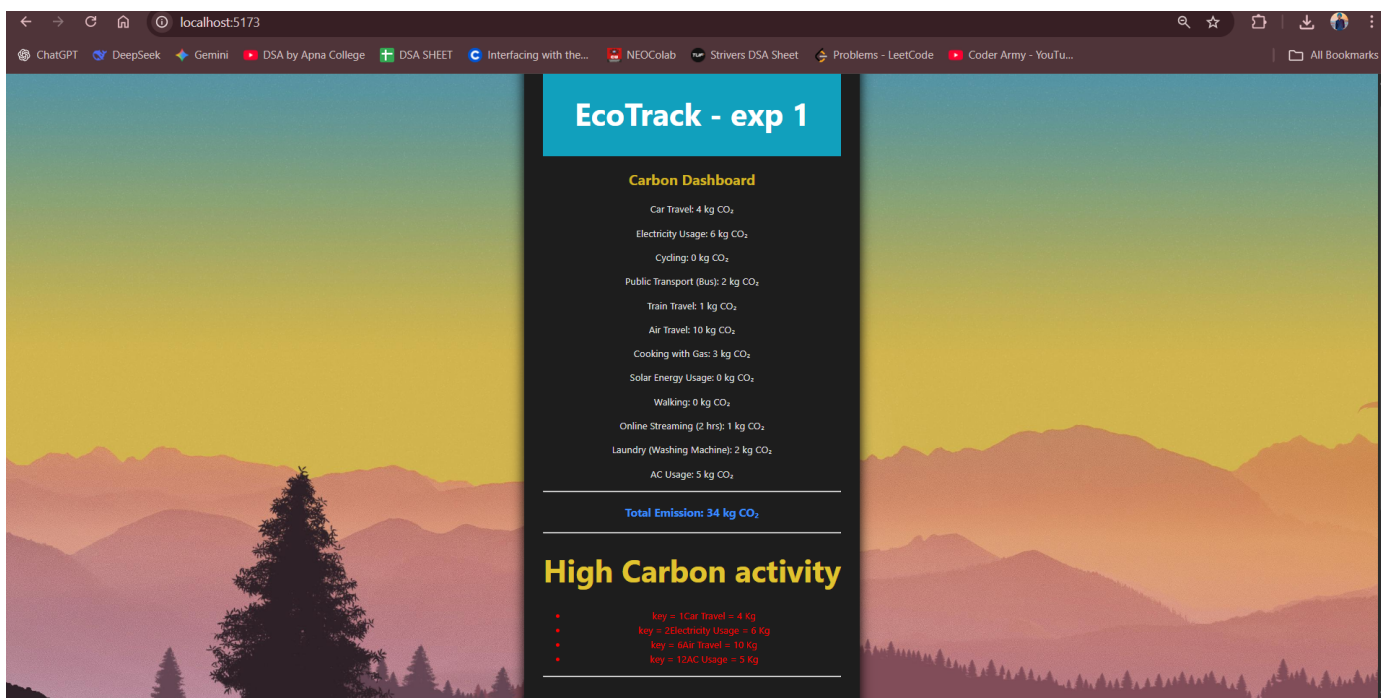
```
Logs.jsx X
experiment-1-ecotrack > ecotrack > src > pages > Logs.jsx > ...
1  import { logs } from "../data/logs"
2
3  const Logs = () => {
4    const validLogs = logs.filter(log => log.carbon !== 0)
5
6    const highCarbon = validLogs.filter(log => log.carbon > 4)
7    const lowCarbon = validLogs.filter(log => log.carbon < 4)
8
9    return (
10     <div className="section">
11       <h3 className="section-subtitle">
12         High Carbon Activities (> 4 kg CO2)
13       </h3>
14       <hr />
15
16       {highCarbon.map(log => (
17         <p key={log.id} className="item high-carbon">
18           {log.activity}: {log.carbon} kg CO2
19         </p>
20       ))}
21
22       <h3 className="section-subtitle">
23         Low Carbon Activities (< 4 kg CO2)
24       </h3>
25       <hr />
26
27       {lowCarbon.map(log => (
28         <p key={log.id} className="item low-carbon">
29           {log.activity}: {log.carbon} kg CO2
30         </p>
31       ))}
32     </div>
33   )
34 }
35
36
37 export default Logs
```

```
App.jsx X
experiment-1-ecotrack > ecotrack > src > App.jsx > ...
1  import Dashboard from "../pages/Dashboard"
2  import Logs from "../pages/Logs"
3  import "../App.css"
4
5  function App() {
6    return (
7      <div className="app">
8        <h1 className="app-title">ECOTRACK (Experiment 1)</h1>
9
10       <div className="card">
11         <Dashboard />
12         <Logs />
13       </div>
14     </div>
15   )
16 }
17
18 export default App
19
```

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4. Output:

- The EcoTrack application displays a Carbon Dashboard
- Activities and their corresponding CO₂ 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