**Mini Project Documentation: Real-Time Fuel Cost Calculator**

**1. Project Overview**

The **Fuel Cost Calculator** is a **single-page, responsive web application** that allows users to **calculate daily, monthly, and annual fuel costs in real-time**. The app also provides **fluid number animations** and **interactive bar charts** for visual representation, making it easy for users to understand fuel expenses at a glance.

**2. Features**

**Core Features**

1. **Real-Time Calculation**
   * Updates fuel requirements and costs as the user types. No calculate button is needed.
2. **Daily, Monthly, Annual Cost**
   * Displays cost breakdown for different time periods.
3. **Animated Numbers**
   * Numbers smoothly transition up and down, providing a fluid iOS-style animation.
4. **Interactive Bar Chart**
   * Bar chart showing daily, monthly, and annual fuel costs.
   * Hover tooltips on all bars for exact values.
5. **Responsive Design**
   * Works seamlessly on both mobile and desktop devices.

**User Assistance Features**

1. **Help Icon**
   * A floating help icon in the header provides guidance on how to use the app.
   * Explains the meaning of inputs: daily distance, fuel efficiency, and fuel price.
2. **Tooltips**
   * Hover over any of the displayed numbers (daily, monthly, annual cost, or fuel required) to see exact values.

**Design Features**

1. **Compact Header**
   * Small, minimal header to reduce space consumption.
2. **Smooth Animations**
   * Both numbers and charts update smoothly to enhance the user experience.
3. **Clean UI**
   * Simple, easy-to-read interface using modern fonts and color gradients.

**3. Technologies Used**

|  |  |  |
| --- | --- | --- |
| Layer | Technology/Library | Purpose |
| Frontend | HTML5 | Structure and layout of the web page |
| CSS3 | CSS | Styling, responsive design, animations |
| JavaScript | Vanilla JS | Real-time calculations, animations, interactivity |
| Charting | Chart.js | Rendering interactive bar charts with hover tooltips |

**CDN Dependencies**:

* Chart.js: https://cdn.jsdelivr.net/npm/chart.js

**4. Application Flow**

1. **User Input**
   * The user enters:
     + Daily distance (km)
     + Fuel efficiency (km/l)
     + Fuel price (per liter)
2. **Real-Time Calculation**
   * The app calculates:
     + Liters required per day
     + Daily cost
     + Monthly cost (daily \* 30)
     + Annual cost (daily \* 365)
3. **Number Animation**
   * Values transition smoothly to new numbers using requestAnimationFrame.
4. **Chart Rendering**
   * Bar chart updates with the new values.
   * Hovering shows exact numbers for each bar.
5. **Help**
   * Clicking the help icon shows guidance for the user.

**5. UI/UX Design**

**Input Fields**

* **Daily Distance**: Numeric input for kilometers per day.
* **Fuel Efficiency**: Numeric input for km/l.
* **Fuel Price**: Numeric input for fuel cost per liter.

**Results Section**

* Shows:
  + Fuel required per day
  + Daily cost
  + Monthly cost
  + Annual cost
* Numbers have **hover tooltips** for exact values.
* Smooth animation when values change.

**Bar Chart**

* Three bars representing:
  + Daily cost
  + Monthly cost
  + Annual cost
* Hover tooltips on all bars.

**Help**

* Floating ❔ icon in the top-right corner.
* Provides instructions without taking extra screen space.

**6. Responsive Design**

* Mobile-friendly using CSS media queries.
* Input fields and chart resize automatically to fit screen width.
* Header and result sections scale appropriately on smaller screens.

**7. Future Enhancements (Optional)**

1. Dark mode toggle.
2. Multiple vehicle profiles.
3. Local storage to save last inputs.
4. Export chart as image/PDF.
5. Integration with mapping APIs to calculate distance automatically.
6. Multi-currency and multi-unit support.

**8. File Structure**

Since this is a **single-file project**, the file structure is simple:

fuel\_calculator.html

* Contains:
  + HTML structure
  + Embedded CSS
  + Embedded JavaScript (real-time calculation, animation, chart rendering)
  + Chart.js CDN inclusion

**9. Conclusion**

This mini project provides a **compact, interactive, and user-friendly** tool to calculate fuel costs. It demonstrates the use of **real-time calculations, fluid animations, responsive design, and data visualization** in a single-page web application, making it both **educational and practical**.