Logistics Management System

Project Report

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GitHub Repository URL: https://github.com/imeshar002/CSC-1012-Logistics-Management-System.git

1. Introduction

This project is a simple C program that manages deliveries between cities using different types of vehicles. The program allows users to:

- Add, rename, and remove cities.
- Set and view distances between cities.
- Add different vehicles and see their properties.
- Record deliveries and calculate delivery cost, fuel used, and time.
- View reports with total deliveries, distance, revenue, profit, and route stats.

The program is organized into separate modules for each task, making it easier to read and maintain.

2. Modules and Functions

2.1 City Management

Manages cities.

- displayCities() – Shows all cities.
- addCity() – Adds a city if it doesn't already exist and the limit isn't reached.
- renameCity() – Renames a city.
- removeCity() – Deletes a city and updates the distance table.

2.2 Distance Management

Manages distances between cities.

- displayDistances(int totalCities) – Prints the distance table.
- setDistance(int totalCities) – Sets the distance between two cities.
- removeDistancesForCity(int removedIndex, int totalCities) – Updates the table when a city is deleted.

2.3 Vehicle Management

Manages vehicles and their properties.

- displayVehicles() – Shows all vehicle types with capacity, rate, speed, and fuel efficiency.
- getVehicleInfo(int vehicleType, int* capacity, int* rate, int* speed, int* fuelEfficiency) – Returns info for a chosen vehicle.

2.4 Delivery Management

Records deliveries and calculates costs.

- addDelivery(int totalCities, int vehicleCapacities[]) – Adds a delivery and calculates costs, fuel, and estimated time.
- displayDeliveries() – Shows all deliveries with source, destination, weight, and vehicle.

2.5 Delivery Calculations

Calculates delivery cost, time, and fuel.

- calculateDelivery(int source, int destination, int distance, int weight, int rate, int speed, int efficiency, int fuelPrice) – Shows base cost, fuel cost, profit, and customer charge.

2.6 Least-Cost Path

Finds shortest path between two cities.

- `calculateLeastDistance(int sourceCity, int destinationCity, int totalCities, int pathResult[])` – Returns minimum distance.

2.7 Reports

Shows summary of deliveries.

- showReports() – Prints:
    - Total deliveries
    - Total distance
    - Average delivery time
    - Total revenue and profit
    - Longest and shortest routes

3. Assumptions and Limits

- Max 30 cities, max 50 deliveries.
- Only three vehicle types: Van, Truck, Lorry.
- Fuel price fixed at 310 LKR per liter.
- Distances must be set before adding deliveries.

4. Conclusion

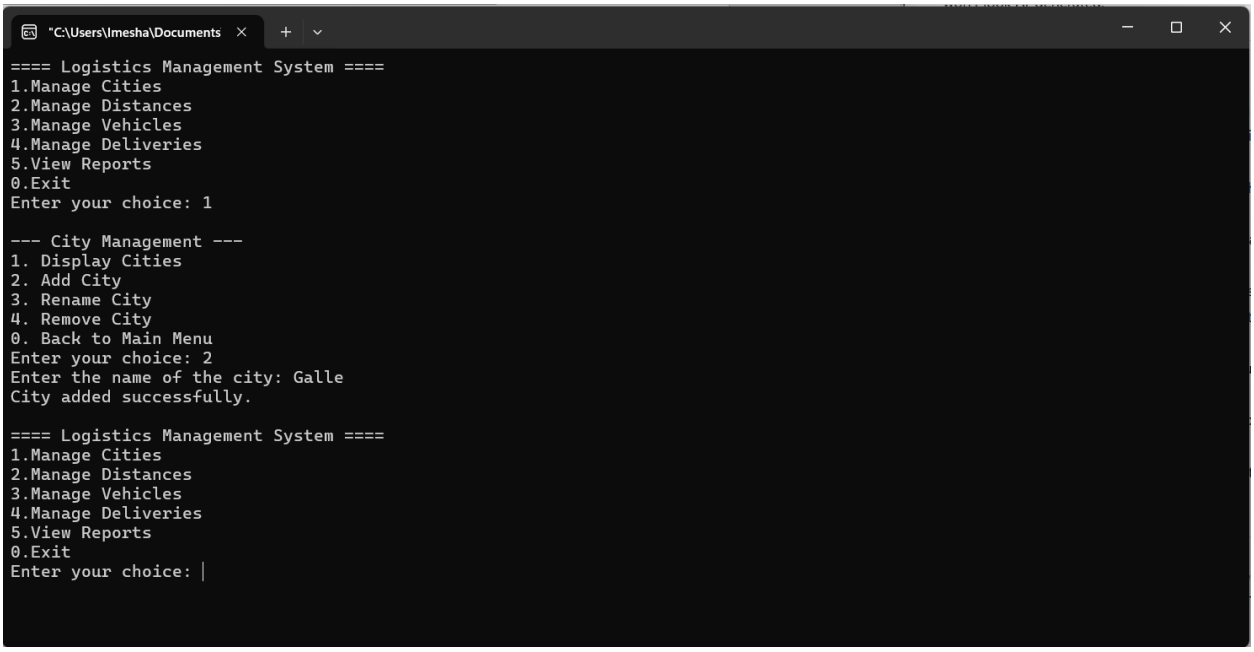
The program can manage cities, vehicles, deliveries, and reports. It is simple, modular, and easy to add new features if needed.

6. Additional Notes

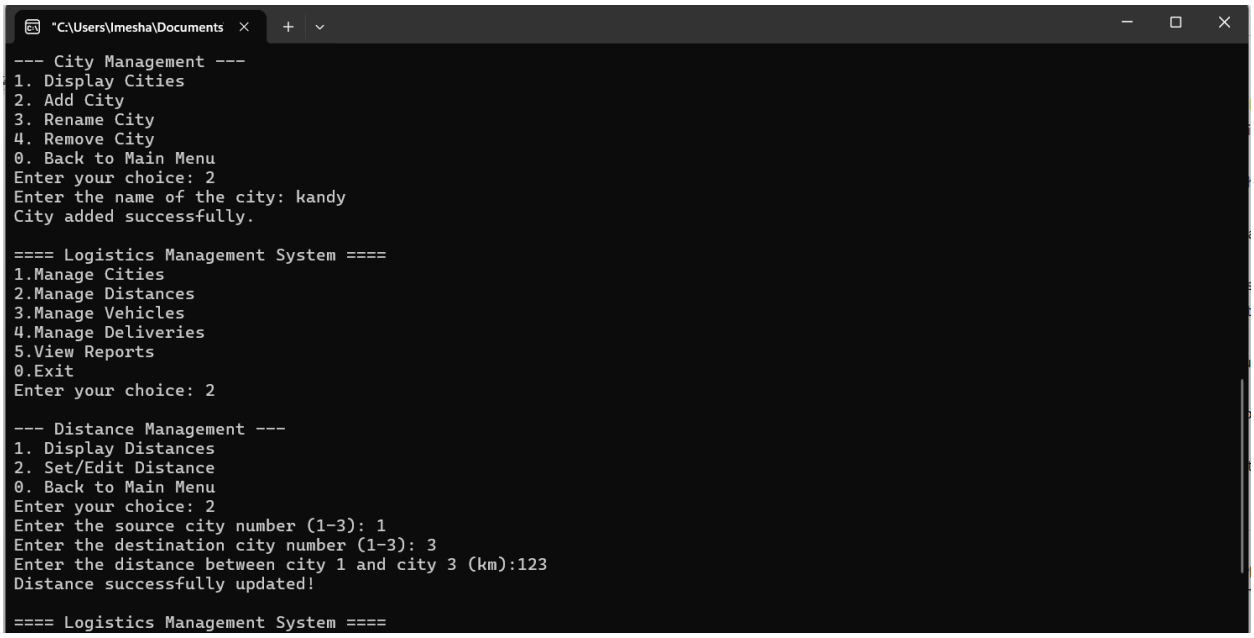
- The GitHub repository for this project is public and contains all the source code, including .c files and headers, with meaningful commit messages showing the progress of the project.
- Screenshots have been included to highlight the main functionalities and user interactions, such as:
    - Managing cities and updating the distance matrix
    - Viewing and selecting vehicles
    - Adding deliveries and calculating costs
    - Generating performance reports with total deliveries, distances, revenue, and profit
- The system has been designed to be modular, making it easy to extend or modify in the future.
- Input validation and error messages have been added to prevent invalid entries and improve user experience.
- All calculations, including cost, fuel, and estimated delivery time, are performed automatically to reduce manual errors.

7. Screenshots

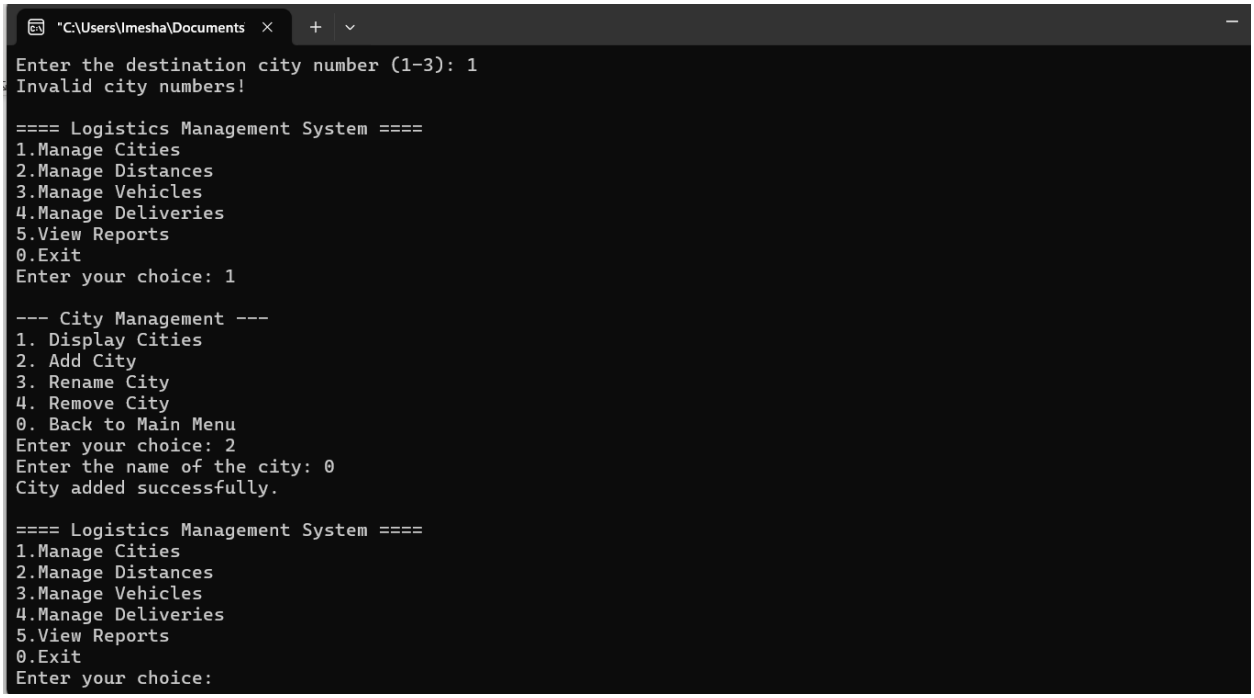
Add city



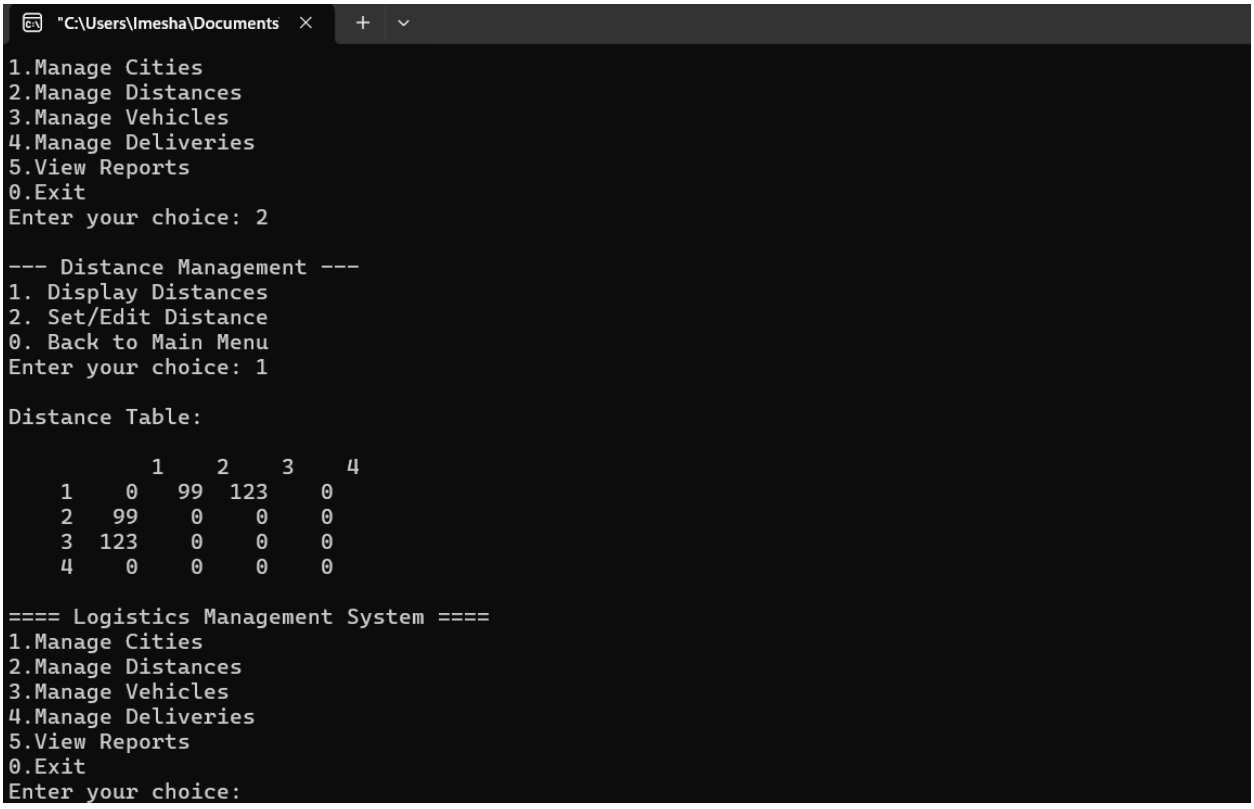
Set distance



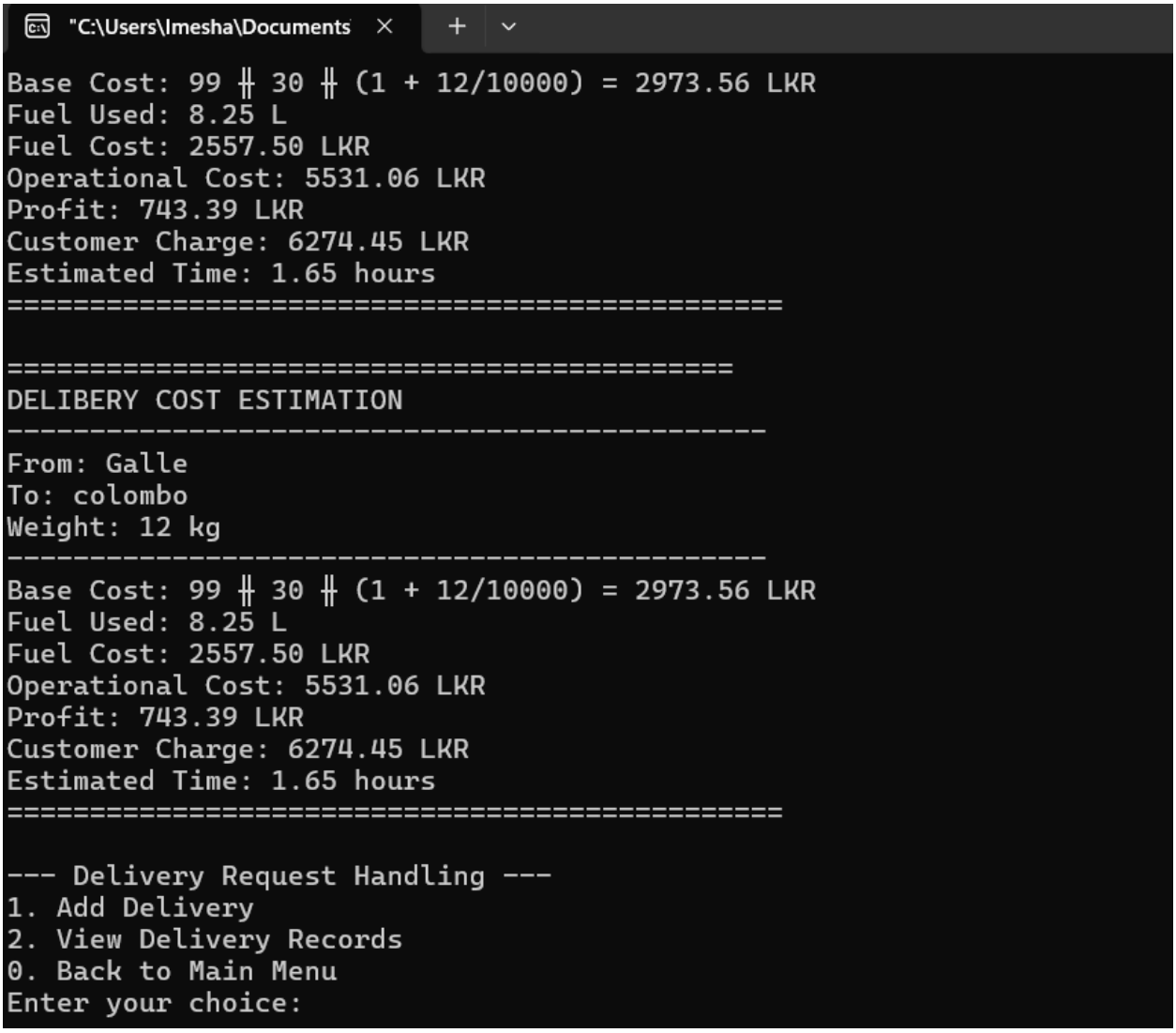
Back to main menu



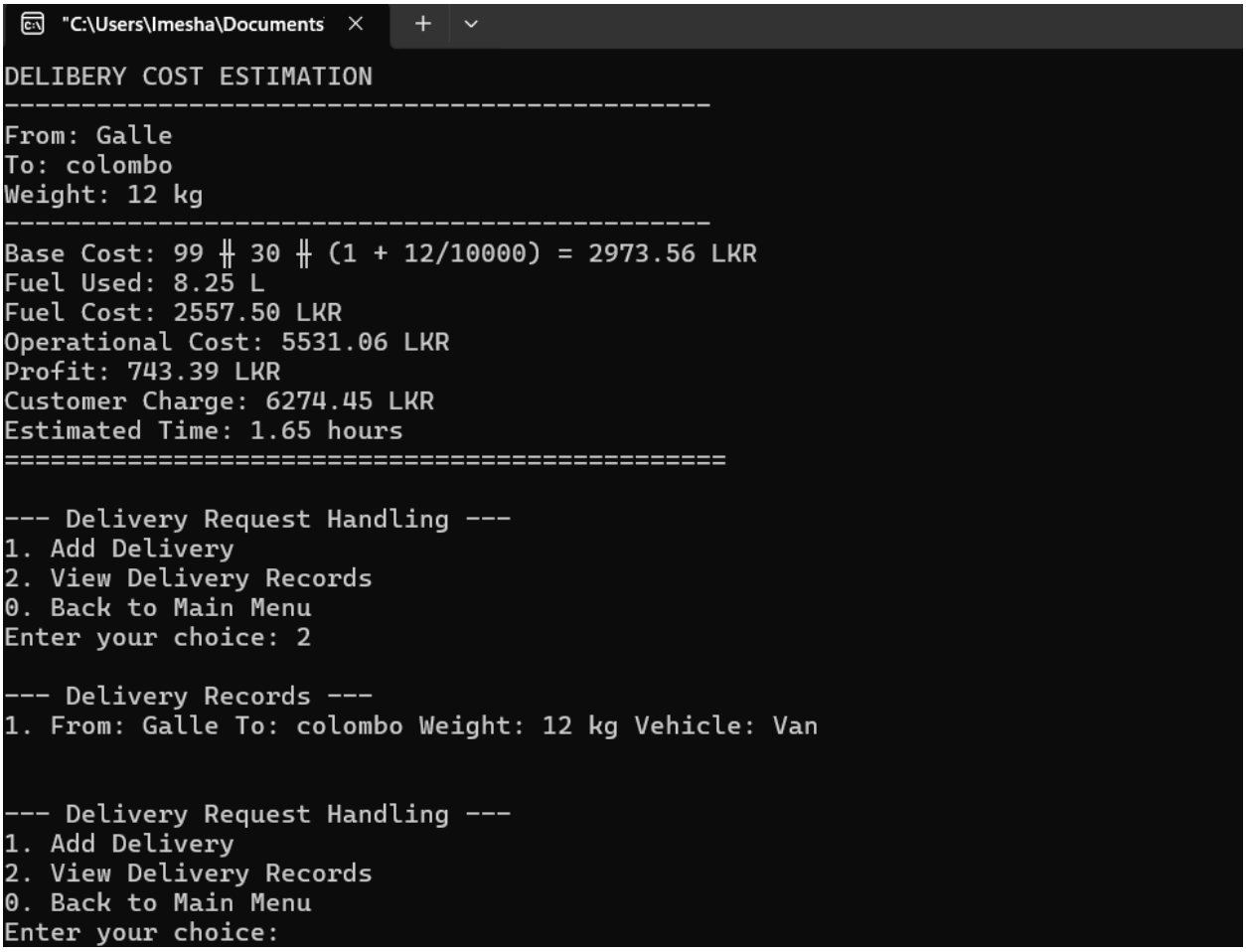
Display distances



Delivery cost estimation



Delivery record


"C:\Users\Imesha\Documents
DELIBERY COST ESTIMATION
From: Galle
To: colombo
Weight: 12 kg
Base Cost: 99 ╫ 30 ╫ (1 + 12/10000) = 2973.56 LKR
Fuel Used: 8.25 L
Fuel Cost: 2557.50 LKR
Operational Cost: 5531.06 LKR
Profit: 743.39 LKR
Customer Charge: 6274.45 LKR
Estimated Time: 1.65 hours
--- Delivery Request Handling ---
1. Add Delivery
2. View Delivery Records
0. Back to Main Menu
Enter your choice: 2
--- Delivery Records ---
1. From: Galle To: colombo Weight: 12 kg Vehicle: Van
--- Delivery Request Handling ---
1. Add Delivery
2. View Delivery Records
0. Back to Main Menu
Enter your choice: