Project Report of Logistics Management System

Project Name: Logistics Management System
Course Name: CSC1020 Introduction to Computer programming
Git hub Repository link: https://github.com/Himansith2004/logistics-management-system
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1. Introduction

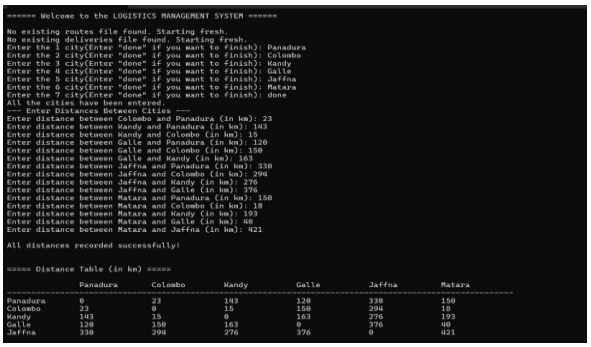
The Logistics Management System is a console-based C program designed to manage city routes, delivery operations, and transportation cost calculations.
It allows the user to:
* Add, rename, and delete cities
* Maintain a distance matrix between cities
* Book deliveries and calculate total costs
* Generate delivery reports
* Find least-cost (shortest distance) routes between cities
* Save and load data persistently from text files

2. System Functionalities

1.Add/Rename/Delete Cities Manage city list.
2.Edit Distances-Modify distances between cities
3.Add NewCity-Append a new city and its distances
4Display DistanceTableView-current city to city distances
5Book a Ride-Estimate cost, fuel usage, profit, and time
6View All Deliveries-Show all recorded deliveries with statistics
7Find Least-Cost Route-Find shortest path between two cities
8Save & Load-DataStores and retrieves all records in text files

1. Add/Rename/Delete Functions

The add, rename and delete city functions are used to manage the list of cities in our delivery system. When we add a city, the program ask the user to enter a new city name and also the distances between that city and others so the distance table stay update. The rename city function is used if we typed a wrong name or want to change a city's name later, it just ask the number of city and then replace it with the new name without affecting other data. Delete city function is for removeing a city that is not used anymore, it delete the name from the list and also remove its distances so the system remain clean. Together these functions makes the program more dynamic and user friendly, letting the user change or fix the city data easily



2.Edit Distances

This function ask the user to enter the numbers of two cities and then the new distance value between them. After the user enter that, the program update the distance in both sides of the distance table so it stays correct for both city directions. It also shows the updated distance table to confirm the changes. This makes it easy to keep the system accurate without adding or removing cities again.

```
========== MAIN MENU ==========
1. Display Cities
2. Rename City
3. Add new city
4. Delete City
5. Edit City Distance
6. Book a Ride
7. Reports
8. Find Least-Cost Route Between Two Cities
0. Exit
Enter your choice: 5

Enter the numbers of two cities to edit the distance between them:
Enter the number of the first city : 1
Enter the number of the second city: 5
Enter the new distance between Panadura and Jaffna (in km): 345
 Distance between Panadura and Jaffna updated successfully!


===== Distance Table (in km) =====

              Panadura        Colombo         Kandy           Galle           Jaffna
-------------------------------------------------------------------------------------
Panadura      0               23              143             120             345
Colombo       23              0               15              150             294
Kandy         143             15              0               163             276
Galle         120             150             163             0               376
Jaffna        345             294             276             376             0


========== MAIN MENU ==========
1. Display Cities
2. Rename City
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5. Edit City Distance
6. Book a Ride
7. Reports
8. Find Least-Cost Route Between Two Cities
0. Exit
Enter your choice:
```
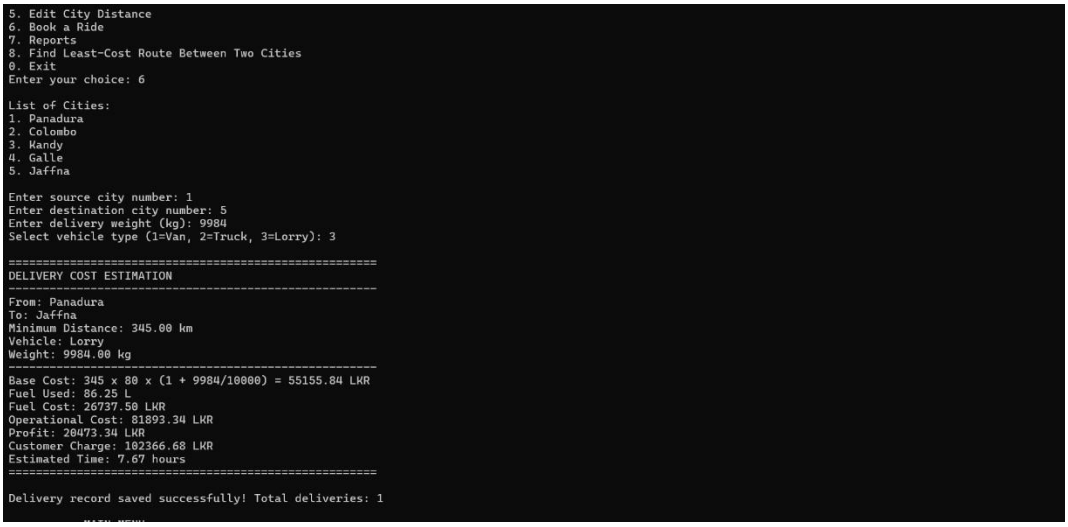

3. Distance Display Function The display distance table function is use to show all the distances between every pair of cities in a clear table format. When the user add cities and enter their distances, this function print them nicely in rows and colums so it's easy to read and check.

```
====== Welcome to the LOGISTICS MANAGEMENT SYSTEM ======

No existing routes file found. Starting fresh.
No existing deliveries file found. Starting fresh.
Enter the 1 city(Enter "done" if you want to finish): Panadura
Enter the 2 city(Enter "done" if you want to finish): Colombo
Enter the 3 city(Enter "done" if you want to finish): Kandy
Enter the 4 city(Enter "done" if you want to finish): Galle
Enter the 5 city(Enter "done" if you want to finish): Jaffna
Enter the 6 city(Enter "done" if you want to finish): Matara
Enter the 7 city(Enter "done" if you want to finish): done
All the cities have been entered.
--- Enter Distances Between Cities ---
Enter distance between Colombo and Panadura (in km): 23
Enter distance between Kandy and Panadura (in km): 143
Enter distance between Kandy and Colombo (in km): 15
Enter distance between Galle and Panadura (in km): 120
Enter distance between Galle and Colombo (in km): 150
Enter distance between Galle and Kandy (in km): 163
Enter distance between Jaffna and Panadura (in km): 330
Enter distance between Jaffna and Colombo (in km): 294
Enter distance between Jaffna and Kandy (in km): 276
Enter distance between Jaffna and Galle (in km): 376
Enter distance between Matara and Panadura (in km): 150
Enter distance between Matara and Colombo (in km): 18
Enter distance between Matara and Kandy (in km): 193
Enter distance between Matara and Galle (in km): 40
Enter distance between Matara and Jaffna (in km): 421

All distances recorded successfully!


===== Distance Table (in km) =====

              Panadura        Colombo         Kandy           Galle           Jaffna          Matara
-----------------------------------------------------------------------------------------------------
Panadura      0               23              143             120             330             150
Colombo       23              0               15              150             294             18
Kandy         143             15              0               163             276             193
Galle         120             150             163             0               376             40
Jaffna        330             294             276             376             0               421
```

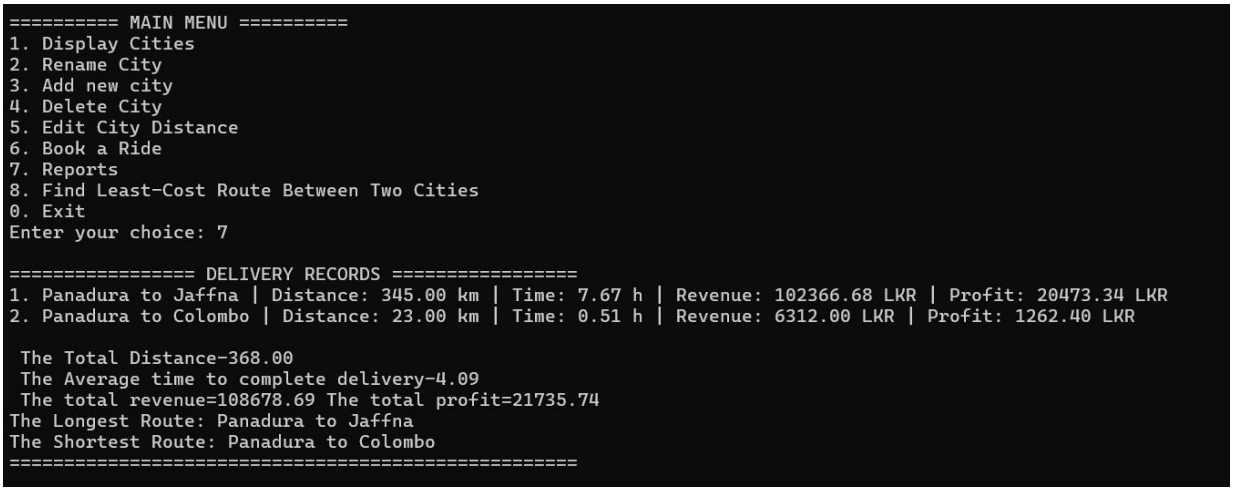
4.Book a Ride function

The Book a Ride function is used when the user want to calculate and book a delivery between two cities. It let the user choose the starting city, the destination city, the vehicle type, and the weight of the goods. Then it use the distance table and some formulas to find how much it will cost, how long it will take, and how much profit the company can make. It also check if the weight is too high for the selected vehicle and warn the user if needed. After calculating everything, it show all the details clearly like distance, fuel cost, total charge, and estimated time. This function make the system more realistic and useful, but sometimes if user enter wrong data like same city or invalid number, it show error messages which is little bit annoying but help to keep things correct.



5. View All Deliveries Function

The View All Deliveries function is used to show a full list of all the delivery records that have been done so far. It display each delivery with details like source and destination cities, distance, time, revenue, and profit in a clear readable way. This help the user to review past deliveries and understand how the system is performing.



6. Find least-cost Route

The Find Least-Cost Route function is used to find the shortest or cheapest path between two selected cities. It help the user to know which route is best to travel with minimum distance or cost instead of going directly. The function use a searching method that check all possible paths between the cities and find the one with the smallest total distance. Then it show the result clearly with the starting city, destination city, total distance, and also the full route to follow.

7. Save & Load Data

The Save & Load Data functions are use to store and get back all the important information like city names, distance tables, and delivery records. The save part write all this data into text files in a readable format so when the program close, the user don't lose any data. The load part read those files again when the system start, so the user can continue from where they stop before. It make the system more smart and reliable because data will not be lost every time. I also get some help from other online resources and examples to build this part, because file handling was little bit hard for me at first

So, in conclusion, this logistics management system project helped me to learnt how to work with arrays, functions and file handling in C programming. I also understand more about storing real-life data like cities, distances and deliveries, and making the system easy for user to use. Some parts like saving and loading data and finding the least-cost route was little bit tricky, but I got some help from online resources and practise a lot. Overall, this project make me more confident in programming and logical thinking, and it was very useful and interesting experiance for me.