CSC 1012 Introduction to Computer Programming

Assignment (Individual)

Logistics Management System

Index: AS20240515

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Link: https://github.com/KethmikaEdirisinghe/Logistics-Management-System.git

Introduction

This project implements a **menu-driven Logistics Management System** using the **C programming language** as a part of CSC 1012 It applies key programming concepts such as arrays, loops, conditionals, and functions to manage cities, delivery routes, and vehicle details in the system.The system calculates delivery time, cost, and fuel usage while maintaining a record of completed deliveries. It can also generate performance reports showing total deliveries, distances covered, and the shortest and longest routes.

- Objectives:

- To design a simple logistics and delivery management system using the C language.
- To apply programming concepts such as arrays, loops, conditionals, and functions.
- To manage cities and record distances between them.
- To handle customer delivery requests and vehicle selections.
- To calculate delivery time, cost, and fuel consumption automatically.
- To store and retrieve delivery data using file handling.
- To generate performance reports showing delivery summaries and route details.

- **Technologies Used** :

  > **Programming Language – C**
  > **IDE – CodeBlocks**

- **Github folder** contains :
- Codefiles:

  > main.c
  > cityManagement.c
  > distanceManagement.c
  > vehicleManagement.c
  > deliveryRequestHandeling.c
  > calculations.c
  > deliveryRecords.c
  > fileHandeling.c
  > findingBestRoot.c
  > InterfaceMainMenu.c
  > performance.c

- README.md
- Project Report

- System Features

1. **City Management** – Add,rename and remove cities from system according to the user's perspective.

2. **Distance Management** – Enter,edit and view distances between cities.

3. **Vehicle Management** – Select vehicles with different capacities, speeds, and fuel efficiencies.

4.**Delivery Request Handling** – Place delivery orders by selecting source, destination, and package weight.

5. **Automatic Calculations** – The system automatically calculates delivery cost, fuel cost, time, and profit.

6. **Performance Reports** – Displays total deliveries, total distance covered, longest and shortest routes, and average delivery time.

7. **File Handling** – Saves all route and delivery data into text files and loads them back when the program restarts.

- Main Structural Functions

Function	Task	Location
cityManagement()	Controls adding, renaming, and removing cities.	cityManagement.c
distanceManagement()	Manages distances between cities (add, edit, and view).	distanceManagement.c
vehicleManagement()	Displays available vehicles and allows selection for deliveries.	vehicleManagement.c
diliveryRequestSection()	Handles user input for delivery requests such as cities and package weight.	deliveryRequest.c
Calculations()	Calculates delivery cost, fuel consumption, time, total cost, and profit.	calculations.c
recordDilivery()	Saves each delivery's data (source, destination, cost, etc.) into the records array.	deliveryRecords.c
performances()	Generates performance reports including totals, averages, and routes.	performance.c
saveRoutesToFile()	Saves city names and distance matrix to routes.txt.	fileHandling.c
loadRoutesFromFile()	Loads city and distance data from the routes.txt file.	fileHandling.c
loadDiliveriesFromFile()	Loads previous delivery records from the deliveries.txt file.	fileHandling.c
saveDiliveriesToFile()	Saves all delivery records and costs to deliveries.txt.	fileHandling.c
findShortestRouteIterative()	Finds the shortest (least-cost) route between two cities using an iterative search.	findingBestRoute.c

- ## Calculations

D = Distance (km)

R = Rate per km (LKR)

W = Weight (kg)

S = Speed (km/h)

Fuel Used = Fuel consumption (liters)

Fuel price (310 LKR per liter)

E = Fuel Efficiency (km/l)

Cost = D × R × (1 + W × 1/10000)

Estimated Delivery Time (hours) = = D / S

Fuel Consumption = D / E

Fuel Cost (LKR) = FuelUsed × F

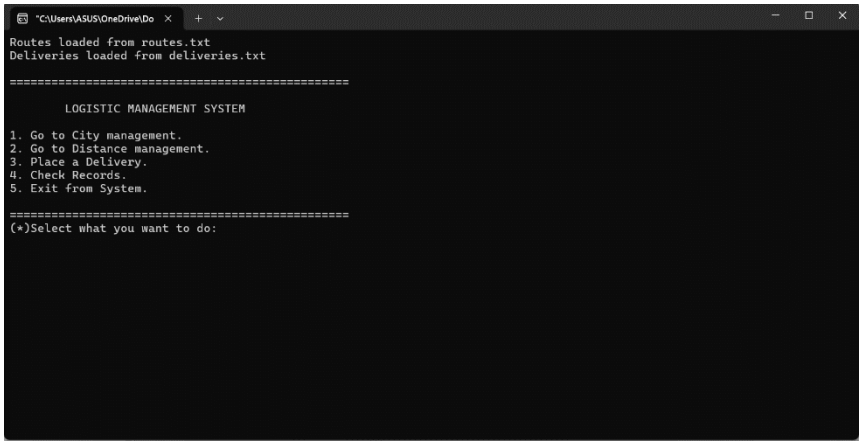
Total Operational Cost (LKR) = DeliveryCost + FuelCost

Profit Calculation (LKR) = Cost × 0.25 (25% markup on base delivery cost)

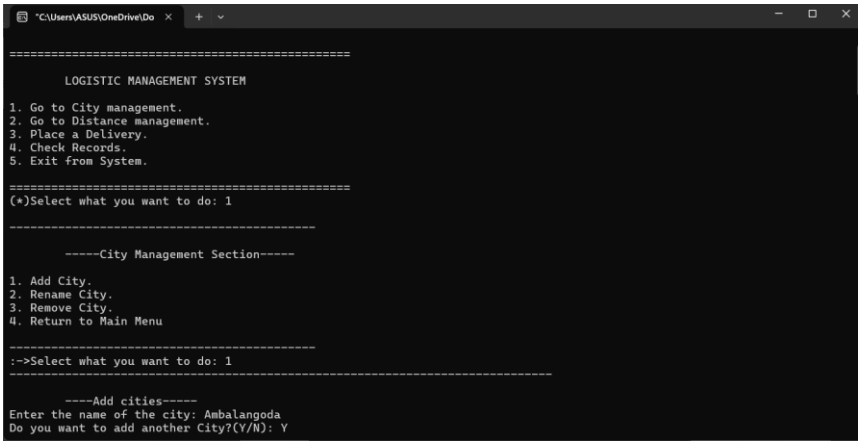
Final Charge to Customer (LKR) = TotalCost + Profit

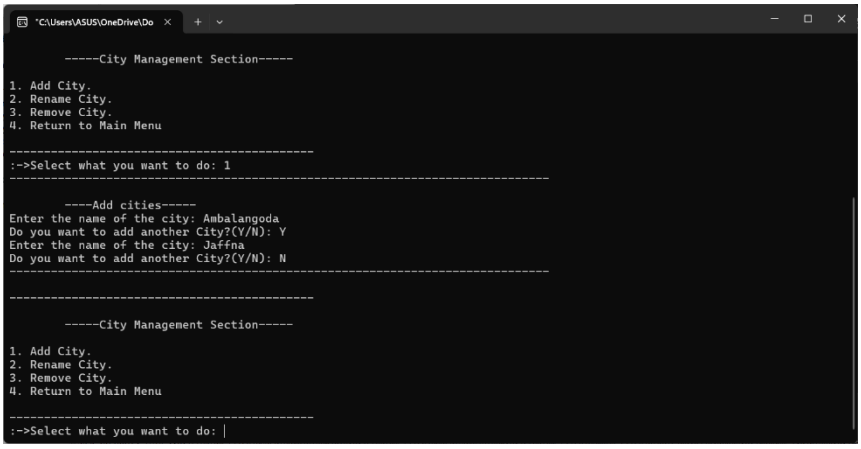
- # System Manual Guide

Main Menu:

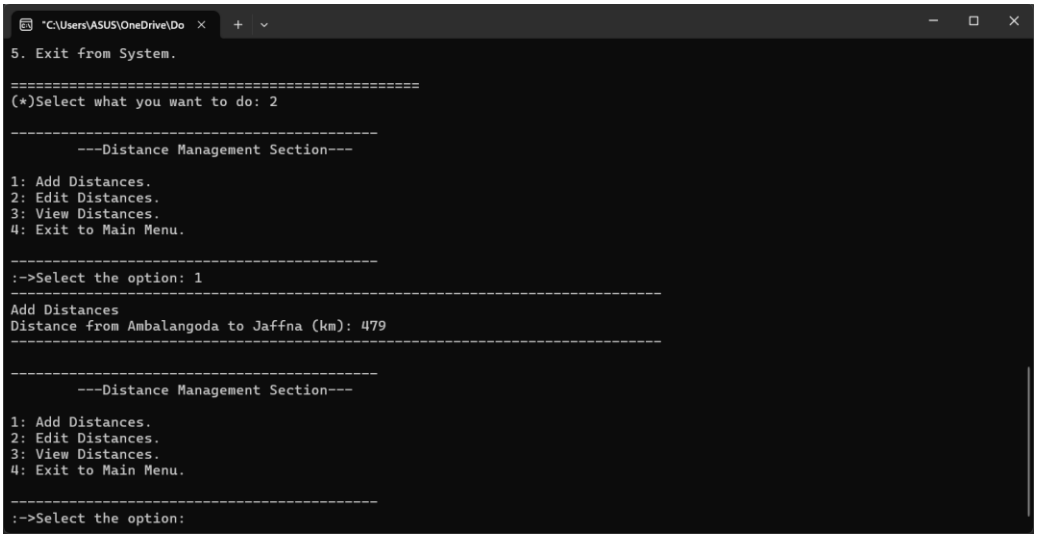


City Management Section:

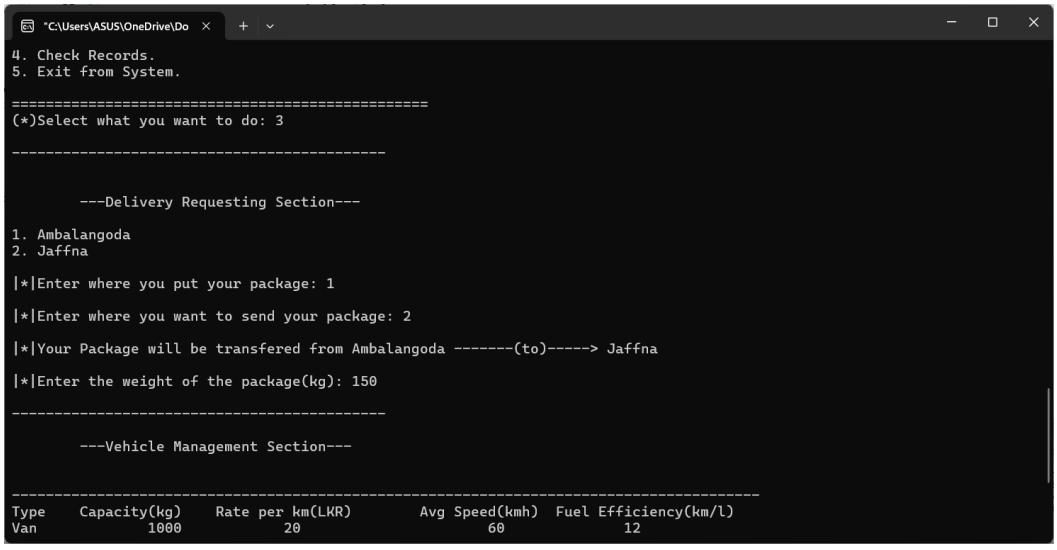




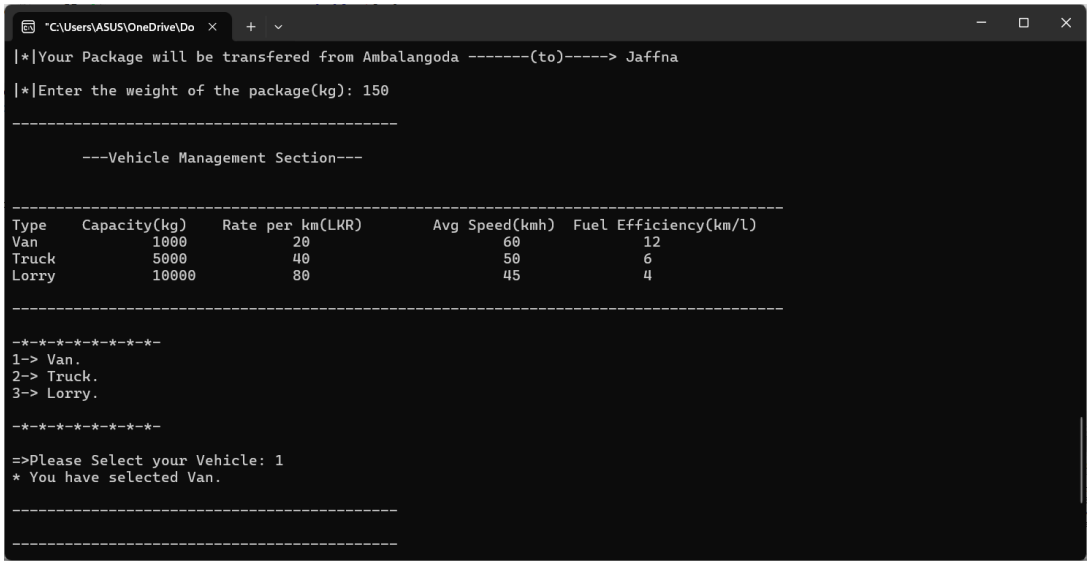
Distance Management:



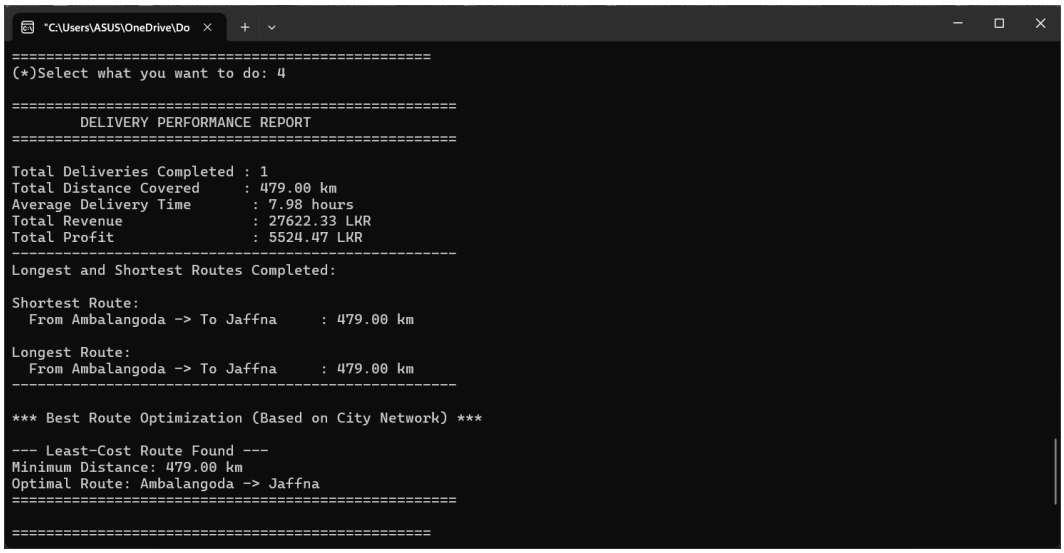
Delivery Requesting:



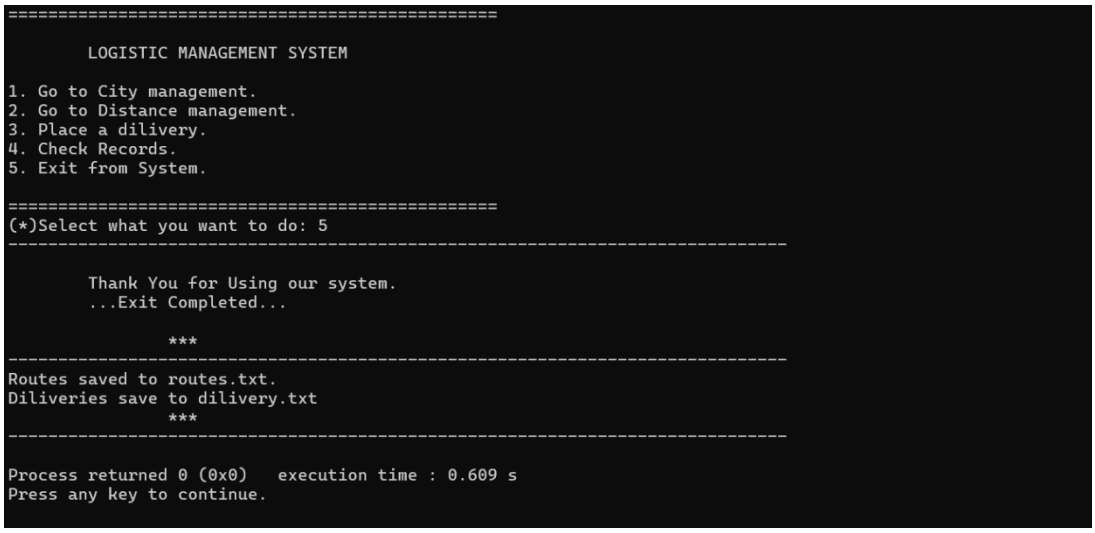
Vehicle Management Section:



Performance and Reports:



Quit from System:



Reference:

- geek for geeks
  - https://www.geeksforgeeks.org/c/basics-file-handling-c/

- Tutorials point
  - https://www.tutorialspoint.com/cprogramming/c_pointers.html

- w3schools.com
  - https://www.w3schools.com/c/c_strings.php

- Youtube : CSE GURU : Travelling Salesman Problem using(TSP) Brute Force Approach | Lec77 | Design & Analysis of Algorithm
  - https://www.youtube.com/watch?v=gsYmZdZuFCw&t=118s

- ChatGTP /Gemini support for Exhaustive Search algorithm,file handeling tips