Bahria University
Discovering Knowledge

ASSIGNMENT No. 3
Problem Based Learning

Course Title: Data structure & Algorithm
Course Code: CSC-221
Class: BS (CS)-3A,3B   Submission deadline: 4-Jun-24
Course Instructor: Lubna Siddiqui   Marks: 10

___

Instructions

1. Students will perform this assignment individually.
2. Deadline will not be extended for any reason.
3. Copied assignments will be marked zero
4. Submit your assignment in soft and hard copies both. Make a single pdf file and upload on LMS.

Scenario

Logistics services refers to the management of goods movement from one point to another in an efficient manner. Logistics service provides you with door-to-door service, this includes the collection, customs clearance, and last-mile delivery. **SwiftEx** is a new logistics company that receives order and plans the most efficient routes of transporting goods. It processes two types of order, *urgent orders* and *normal orders*. Urgent orders are processed on immediate basis.

Factors such as mode of transportation, distance and deadlines are to be considered while processing orders. When an order is received, from the customers. SwiftEx verifies the order details and also notifies the customer through text messages. To maintain the customer satisfaction and to find economic solution, the manager of SwiftEx Karachi branch wants to manage the transportation of orders/parcels in an efficient way. He planned different schemes to distribute the orders that should be maintained economically.

   a. Process urgent orders separately on immediate basis.
   b. Normal orders are delivered to the customers in a same way as they ordered.
   c. Normal orders are delivered to the customers by calculating the distance of customer's destination. The order having the smallest distance will distribute first.

Assumptions

The riders are given N parcels (orders) each day that they have to deliver to the customers. You are asked to simulate all schemes with at least 15 parcels (orders). The cost of one liter petrol is 289.33 rupees. Assume that on average 35 km distance is covered in 1 liter petrol.

Deliverables.

Create the code in C++ by applying appropriate data structure for scheme a, b & c by considering the assumptions mentioned above. (CLO4, PLO4, C6)

Analyze the time complexity of all schemes. (CLO 3, PLO2, C4)

Explain the use of data structure that you used for all schemes and also provide comparison with calculation for consumption of petrol for scheme b and c. (CLO1, PLO1, C2)

Note: Single file is required with title page, index page, codes with output, calculations and comparisons.

Evaluation Criteria and Targeted CLOs

Deliverables	Evaluation Criteria	Targeted CLOs
Algorithm and Code	50 %	CLO-4,PLO-4,C6
Time complexity Analysis	25 %	CLO-3,PLO-2,C4
Comparative study and use of data structures	25%	CLO-1,PLO-1,C2