UNIVERSITY OF ENGINEERING AND TECHNOLOGY
LAHORE, NEW CAMPUS

PROPOSAL FOR DSA SEMESTER PROJECT

Submitted To:

Mam Farah Adeeba

Submitted By:

Samar Noor Riaz
2023-CS-630

Section A

DEPARTMENT OF COMPUTER SCIENCE

Drivio – DSA Based Ride-Hailing System in C++

Group Member: 2023-CS-630 (Samar Noor Riaz)

Description:

The project – DRIVIO is a ride-hailing system that uses advanced data structures and algorithms to efficiently handle user registration, driver allocation, location management, and ride requests.

Problem Statement:

In existing ride-hailing systems, efficiently managing driver-customer assignments and calculating optimal routes is challenging. Ensuring quick responses to customer queries while maintaining system scalability is crucial for delivering effective transportation services.

Features:

1) Role based access and authorization for all users (admin/customers/drivers).
2) Admin can manage users (drivers/customers) and define location-based driver visibility.
3) Customers can request rides, view nearby drivers, and get real-time location suggestions.
4) Drivers locations will be updated and ride requests will be received dynamically.
5) Shortest path calculation between locations using weighted graphs.
6) Efficient ID generation and storage using AVL trees.
7) Sort data for admin analytics, such as total rides and revenue.
8) Real-time driver ETA for customers.

Usage of Concepts:

Weighted Graphs: Represent locations and calculate shortest distance or time using Dijkstra's algorithm. (Finding optimal route for drivers)
AVL Trees: Maintain balanced storage of unique random IDs for scalability and efficiency.
Linked Lists: Store graph nodes and adjacency lists for efficient traversal.
Tries: Provide auto-suggestions for location inputs dynamically.
Stacks: Used to track driver history or undo recent ride assignments.
Queues: Manage customer ride requests and allocate them to drivers in a first-come, first-served manner.
File/Database Management: Ensure persistence and easy access to user and ride data.
Sorting Algorithm: Merge sort for accurate and stable analytics results for admin.

Other Concepts: Hashing, heap and other algorithms may also be used if needed.