**Quiz 2 (Marks = 20)**

The flight scheduling problem with the objective of minimizing cost for different people involves arranging flights for a group of individuals traveling from various locations to a common destination while aiming to minimize the overall cost of their flights.

**Given Information:**

* List of people with their names and departure locations.
* Flight schedule data including origin, destination, departure time, arrival time, and price for a set of flights.

**Problem Statement:**

* The task is to schedule flights for each person from their departure location to the common destination, ensuring that:
* Each person arrives at the destination on the same day.
* Flights are shared among the group to reduce costs.
* The total cost of flights for the group is minimized.

**Constraints:**

* All people arrive and depart on the same day.
* Each person must take a valid flight based on the available flight schedule.
* Flights may have different durations, prices, and departure times.
* Optimization goal: Minimize the total cost of flights for the group.

**Objective:**

Find an optimal flight schedule that meets the constraints and minimizes the total cost of flights for the group of people.

Flight schedule is given in a file named as schedule.txt

LGA,MIA,20:27,23:42,169

MIA,LGA,19:53,22:21,173

LGA,BOS,6:39,8:09,86

BOS,LGA,6:17,8:26,89

LGA,BOS,8:23,10:28,149

Each line represents a flight with the following format:

* Origin airport code (e.g., LGA for LaGuardia Airport)
* Destination airport code
* Departure time in HH:MM format
* Arrival time in HH:MM format
* Price of the flight

**Fitness Function:**

Fitness function is the total cost by summing up the prices of all flights in all combinations.

**Population:**

A single population in the context of a genetic algorithm for the flight scheduling problem will represent a set of flight combinations.

population = [

[('LGA', 'MIA', 20:27, 23:42, 169), ('MIA', 'LGA', 19:53, 22:21, 173), ...], # Flights for person 1

[('LGA', 'BOS', 6:39, 8:09, 86), ('BOS', 'LGA', 6:17, 8:26, 89), ...], # Flights for person ]

**For example:** Person 1 takes a flight from LGA to MIA at 20:27 arriving at 23:42 for a cost of 169, followed by a return flight from MIA to LGA at 19:53 arriving at 22:21 for a cost of 173.

**Mutation:**

You have to perform mutation to generate new combinations of populations. Propose your own algorithm to do so.

Instructions:

* Code sharing is not allowed.
* Use of Cell Phones/Laptops is strictly prohibited.
* Any plegiarism will lead to DC Case.
* Properly document your code by adding comments.
* Make useful assumptions wherever required.