Assignment 03 & 04
Timetable Generator Using Genetic Algorithm

Problem

The assignment is to find generic solution that will facilitate generating schedule for university using "**Genetic Algorithm**".

- You have to write code from scratch.
- You cannot use any built-in library for the implementation of Genetic Algorithm except Pandas and NumPy.
- You can use any kind of crossover discussed in class.
- You can choose any rate of mutation (which can be justifiable)
- You have to roulette wheel selection for selecting potentially useful solutions for recombination (Chromosomes).

The success of solution is estimated on fulfillment of given constraints and criteria. Results of testing the algorithm show that all hard constraints are satisfied, while additional criteria are optimized to a certain extent. You have to submit .ipynb with a one-page report of your implementation .pdf.

Constraints

There are set of constraints that need to be fulfilled.

Hard Constraints

- No teacher can hold two classes at the same time
- No section can listen for two classes at the same time
- No classroom can receive two classes at the same time
- No teacher can hold three consecutive classes
- There will be no class before 8:30 am and after 5:00 pm.
- University will remain close as there will be no class on weekends (Sat, Sun)

The above-mentioned constraints must be satisfied.
Soft Constraints

- There will be no class from 1-2 on Friday.
- No section can hold three consecutive classes.
- A subject having multiple forms, such as lectures and labs, the preferred order is: lecture and lab.

- One hour for faculty meeting in a week when there is no class except Friday's prayer break.

Input & Output

Input data for each class are *professors' name*, *course*, *se*ction, *duration* and list of *allowed classrooms*.

Output data are classroom and time for each class. Time is determined by day (Monday to Friday) and start hour of the class.

- Output will be a chromosome which satisfied all hard constraints and soft constraints at least four. (as much as you can)
- You have to display a list of all hard and soft constraints which are fulfilled in the output.
- Don't forget to show fitness values at each iteration.

Evaluation Criteria

The weightage for this assignment will be doubled of normal assignments.

Requirement	Marks
Fulfillment of hard constraint	10*6 = 60
Fulfillment of soft constraint	05*4 = 20
One-page report .pdf	20
.ipynb file containing code in python	50

Submission

- Assignment must be submitted in the google classroom.
- Submission other than google classroom won't not be accepted.
- You are required to submit a .zip file containing notebook and document.
- Name of zip file should be **"A03- <17I-XXXX>.zip"**
- Pdf file name pattern should be **"A03-<17I-XXXX>.pdf"**
- Name of the file uses pattern **"A03- <17I-XXXX>.ipynb"**