EECS 12 Assignment 3, Fall 2018
Due: *5pm, Nov 2, Friday*

Description:

Ten cars with ID from 1 to 10 are racing with each other through some given number of laps. All laps are of a given distance. Every car runs at a constant speed at each lap but the speed varies randomly between the min and max speeds in different laps. In every even lap, some cars will fall if their speeds are within ±2.5% of the medium value of the allowed speed range, and cannot participate in the race anymore.

User Inputs:

1. **Laps:** Number of laps to be covered in the race (>1)
2. **Distance:** Distance for each lap (>=10 km)
3. **Min_Speed:** The minimum speed the car should keep in the race (>=40 km/h)
4. **Max_Speed:** The maximum speed the car can run (>min speed)

Requirement:

1. Write a program to simulate the game and ask for the four input parameters.
2. After each lap, show the **total time** used by each car by their ID sequence, the current **speed** in the lap, and the **standing** using the car IDs with the first place car in front. **Do not** include failed cars in the standing. You should mark the speed and the total time of any failed car by -1.
3. If a car runs at a speed within the failure speed range (±2.5% of the medium speed) in an even lap, mark the car as failed and print a failure message with car ID and speed.
4. Print a line between laps. For each lap, print the lap number first and those data in requirement 2.
5. All values for speed and total time should be printed with up to 2 decimal places and speed value in **km per hour (km/h)** while the total time used should be in **minutes**.

Sample Output:

```
Number of laps in the race (>1): 2
Distance of a lap (>=10km): 20
The minimum speed for each car(>=40km/h): 40
The maximum speed for each car(>min_speed): 300

You have set the speed range: [40, 300]
Engine failure speed range defined: [163.5, 176.5]
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After Lap 1:
Car speed: [296.45, 178.06, 274.58, 41.24, 183.83, 264.5, 89.44, 57.78, 156.12, 79.42]
```

```
Total time used (minutes): [4.05, 6.74, 4.37, 29.1, 6.53, 4.54, 13.42, 20.77, 7.69, 15.11]
Current standing: [1, 3, 6, 5, 2, 9, 7, 10, 8, 4]
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After Lap 2:
Car 5 failed at speed: 166.73
Car speed: [270.22, 242.6, 217.21, 68.01, -1, 233.43, 217.03, 183.34, 233.38, 285.93]
Total time used (minutes): [8.49, 11.69, 9.89, 46.74, -1, 9.68, 18.95, 27.32, 12.83,
19.31]
Current standing: [1, 6, 3, 2, 9, 7, 10, 8, 4]
```

Grading Criteria (100 points):

- Program can run without error (10 pts). Comments on the top of the program include your name, ID (10 pts). Give hints and get inputs (10 pts).
- For each lap, Correctly compute and print the speed of each car. (10 pts).
- For even lap, Correctly compute and print the failure message with the car ID (10 pts).
- For each lap, Correctly compute and print the elapsed time of each car (10 pts).
- For each lap, Correctly compute and print the cars' ID according to their rank (30 pts).
- Correctly Print required separate line and blanks. (10 pts)

Submission:

Submit your homework **before 5pm, Nov 2 (Friday)** to the canvas server. Submit only the Python source file with filename "**hw3.py**".