Department of Computing
The Hong Kong Polytechnic University

COMP1012 Programming Fundamentals and Applications

Course Project

Due Time: 23:59 on 30 November 2022

Course project is an independent group work that students should team up by **2-3** members and work out the problem independently. You are required to form the team and submit the information of all members including name, student ID, and email address via an online form **before 23:59 on 3rd November 2022**. If any student fails to join any team, he/she will be randomly assigned to a team. Within a group, all the members should participate in the project development and be responsible for some tasks (design, implementation, testing, etc.).

1. What to Do

As an important part of an intelligent transportation system, driving behavior analysis helps us to identify dangerous driving scenarios to avoid traffic accidents. The project is to analyze driver behaviors.

We provide a dataset, which records drivers' driving behavior over **10 consecutive days**. You are required to design and implement Python program to analyze the data and complete following tasks:

a) **Dataset overview.** You are required to statistics the dataset and let the audience know the basic information about the dataset such as how many records and how many drivers the dataset contains.

b) **Driver behavior statistics.** You are required to conduct statistical analytics on the driving behavior. The information includes but not limited to the datetime, the car plate number, the cumulative number of times of overspeed and fatigue driving, the total time of overspeed and neutral slide. The statics results should be well organized and automatically saved in a file (e.g., txt, json, csv) with formatted output.

c**) Driving speed analytics.** You are required to use a diagram to plot the driving speed of each driver during the given period, and then discover and compare the characteristics and patterns of driving speed for each driver.

d) **Fatigue driving analytics.** You are required to first analyze the correlation between fatigue driving and any other features that can be extracted from the given data, and then share your insights of in what conditions fatigue driving is prone to happen. Justify your insights with data analytical results.

2. What to Submit

Each group is required to submit a compressed file (.zip) containing the following items:

- Source code in a folder
- Analytics results in a folder
- A report in PDF format, which should at least have:
  - Cover page with title and the information of each team member
  - The design of the analytics program
  - Overview of the dataset
  - The analytics goal or hypothesis in each task and the corresponding analytics results.
  - Summary of findings and conclusions
  - Tasks performed by each member

3. Grading Criteria

- Zero tolerance for late submission, cheating, and plagiarism.
- Program implementation (70%)
  - Driver behavior statistics
  - Driving speed analytics
  - Fatigue driving analytics
  - Running of the program: no run-time error
  - Clean and concise code style
- Documentation: the PDF report (30%)

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