Python Programming Assignment
Introduction to Programming
Sections: A, B & C
IPM Batch 02 Term III
Deadline: 23:59 on Wednesday, 16-June-2021

Instructions

1. Please note that you have to upload the solutions before the deadline to the course portal

2. Please use Python 3 for answering the following questions in case if you need to use Python. Also write a short report/note on the assignment explaining your assumptions/your design choices/functionality etc. to understand your code in a better manner. It is also a good practice to use comments extensively in your code, so that it will be easy for other people to understand it.

3. The Python code for answering the questions can be either submitted as one single *jupyter* notebook or multiple *jupyter* notebooks. I n addition to submitting your *jupyter* notebook/ notebooks, please also export the Python code as a file from the *jupyter* notebook ('*File*' –> '*Download as*' –> '*Python (.py)*') and upload the exported Python code file, in addition to *jupyter* notebook, as we have seen many times the *jupyter* notebook fails load due to mismatch of versions/OS etc.. Alternatively, if you are using any other IDE (Integrated development environment), then you can also submit your code as one single python file (with .py extension) containing all the source code from different classes/modules/functions etc. You can also add all the code files (.py, jupyter notebooks etc.) into one zip file and upload the zip file along with the main report file to the course portal.

Python Programming Assignment

As part of this assignment, you will need to develop a program using object-oriented features of Python language for the following program specification.

Program Specification

Let's imagine a hypothetical situation that IIM Rohtak has now planned to introduce a new Diploma programme for Data Science with the following four courses:

1. Python Programming Course

2. Data Mining and Machine Learning Course

3. Visual Analytics Course

4. Text Analytics Course

Imagine that you are hired as a lead developer to develop a system for managing the Diploma Programme for Data Science. You are asked to develop the system (a program) in the Python language by duly incorporating object-oriented programming features so that the system will be easy to maintain, debug and also to extend the functionality later on if necessary. The following are the key requirements of diploma programme for Data Science.

a) In order to ensure the quality of the students graduating from this programme, the course management has introduced 5 mandatory assignments in each course. The mandatory assignments from each course are graded as either Pass or Fail. To pass a course, a student has to pass at least 3 out of 5 mandatory assignments for that course.

b) In order to pass the whole diploma programme in Data Science successfully, a student needs to pass all the courses individually, by meeting up the requirements of passing 3 out of 5 mandatory assignments, in each course of the diploma programme.

c) Additionally, a student can also get a diploma certificate with distinction, if the student passes at least 17 mandatory assignments (out of a total of 20 assignments) from all the courses. Please note that this design choice chosen by course coordinators will make sure that a student, who wants a distinction, will have to pass all the 5 mandatory assignments from at least one single course (and 4 out of 5 assignments for the remaining 3 courses) to qualify for the distinction.

Finally, if some of the requirements are not clear from the above requirements specification, please make suitable assumptions and describe/specify your assumptions about the functionality in the report.

Your Program

You MUST develop a program using Python language that will satisfy the functionality specified above. Based on your understanding and interpretation, there are many ways to develop such a program to satisfy above requirement specification. Therefore, please use your creativity to come up with a suitable design, that is which class will contain which functionality, which methods and so on. Please also keep your main focus to use various good programming techniques and practices that you have learnt in this course. For example, you should use proper exception handling with appropriate error messages at suitable places where you can expect exceptions and errors in your programme. The final output of your implementation should be a bunch of Python classes with some example code for testing the use cases/ scenarios such as

1. Adding/deleting a new course,

2. Creating and adding students to a course,

3. Grading of the mandatory assignments i.e. a pass/fail for a student etc.

4. To get an overview at the diploma programme/course level to see how many students passed the programme and similarly

5. Test code to show the lists of students: a) who passed with distinction, b) passed and c) failed.

Hint It is strongly advised to go with your own design for the above specified functionality. However, if you are looking for some help about which classes you need to have and what functionality/methods the classes should offer, here are some tips about the design of the classes. At the bare minimum, your program should have the following classes with the functionality/methods (but not limited to) as outlined briefly.

- DiplomaProgramme
  - add course
  - remove course
  - list students who passed
  - list students who passed with distinction

- Course
  - add student
  - remove student
  - pass a student's mandatory assignment
  - fail a student's mandatory assignment

- Student
  - student information such as name, unique ID
  - information of signed up courses
  - information mandatory assignments passed/fail
  - print method to print student's info

Again, please note that the above-outlined functionality/methods are very minimal and therefore add/modify it suitably to handle the given specification.