

CS 115 - Introduction to Programming in Python

Lab Guide 08

Lab Objectives: Classes and Inheritance

Instructions: Upload your solutions as a single .zip file to the Lab08 assignment on Moodle before the end of your lab session. Use the following naming convention: SS_Lab08_Surname_FirstName.zip where SS is the section number 01, 02, 03, etc.

1. Download the class `Question` (`Question.py`) that represents a typical Exam Question object. Review the details of this class.
 - a. The class stores the following data attributes:
 - `questionText`
 - `correctAnswer`
 - `score`
 - `studentAnswer`
 - b. The class defines the following methods:
 - an `__init__()` method that initializes the first 3 data members with values passed as parameters, initializes `studentAnswer` to None.
 - Methods to return and update the values of all data attributes.
 - `isCorrectAnswer()`: returns True if the correct answer matches the `studentAnswer`, false if not.
 - `answerQuestion()`: takes an answer as a parameter, and sets the `studentAnswer` with the value passed as a parameter.
 - `scoreQuestion()`: if the `studentAnswer` is correct return the question score, otherwise return 0.
 - `displayQuestion()`: prints the question text.
 - `__repr__()` returns the string representation of the `Question` object formatted as in the sample run.

- c. Write a class called `TrueFalseQuestion` (`TrueFalseQuestion.py`) that represents subclass of a `Question`.
 - a. The class will store the additional data attribute:
 - `incorrectPoints`: the number of points to be deducted in case of a wrong answer.
 - d. Your class should have an `__init__()` that:
 - initializes the inherited data members to values passed as parameters, using the super class `__init__()` method.
 - initializes the `incorrectPoints` to the final value passed as a parameter.
 - e. You should override the following inherited methods:
 - `scoreQuestion()`: if the `studentAnswer` is correct return the question `score`, otherwise return the negative incorrect points.
 - `displayQuestion()`: prints the text: 'True or False: ' followed by the question text.
2. Write an application, `Exam.py`, that includes the following functionality:
- a. `initializeQuestions()`:
 - takes a `fileName` and an empty list as parameters.
 - Using the data about Questions in the file, creates `Question/TrueFalseQuestion` objects and adds them to the list passed as parameter.
 - b. `gradeExam()`:
 - Takes a list of `Question` objects as a parameter.
 - Displays a header `*** Grading Exam ***`, see sample run for details.
 - Scores each question and returns the total points, and the sum of the correct answers for all questions. Correct answer score should be determined using the `scoreQuestion()` method for each question.
 - For each question answered incorrectly, displays the questions with the heading 'Incorrect Answer'. (see sample run)
 - Displays a footer `*** End of Grading ***`, see sample run for details.
 - c. The program should do the following:
 - Read the questions from the file using the function defined above.
 - For each question in the list, display the question and input the student's (user's) answer.
 - Store the student answer for each question.
 - Once the exam is finished, grade the exam using the function, and display the final score as shown in the sample run.

Sample File:

The file is a semi-colon delimited file, containing the following on each line: type of question (T for True False or R for regular), the question text, the correct answer, and the points. If the question is a true false question, it also contains points to deduct in case of an incorrect answer.

```
T;Python is not a high level programming language?;False;5;2;
R;Who invented Python?;Guido van Rossum;3;
R;In what year was Google launched on the web?;1998;5;
R;In computing what is Ram short for?;Random Access Memory;5;
T;The # symbol can be places to the right of an executable statement ?;True;4;1;
T;Non-zero values map to False in Python?;False;5;3;
```

Sample Run:

True or False:

Python is not a high level programming language?

Enter choice: True

Who invented Python?

Enter choice: I don't know

In what year was Google launched on the web?

Enter choice: 1998

In computing what is Ram short for?

Enter choice: Random Access Memory

True or False:

The # symbol can be places to the right of an executable statement ?

Enter choice: True

True or False:

Non-zero values map to False in Python?

Enter choice: False

*****Grading Exam*****

Incorrect Answer!

Python is not a high level programming language?

Your Answer:True

Correct Answer:False

Incorrect Answer!

Who invented Python?

Your Answer:I don't know

Correct Answer:Guido van Rossum

*****END OF GRADING*****

Your score is: 17 / 27