

CS 115 - Introduction to Programming in Python

Lab Guide 08

Lab Objectives: Classes and Inheritance

1. Download the class `Question` ([Question.py](#)) that represents a typical Exam Question object. Review the details of this class.
 - a. The class will store the following 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 all data members.
 - `getPoints()`: returns the points (note: returns the score of the question)
 - `getScore()`: returns score if answer is correct, 0 if incorrect.
 - `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.
 - `displayQuestion()`: prints the question text.
 - `__repr__` returns the `Question` formatted as a string. See sample run.
2. Write a class called `MultipleChoiceQuestion` ([MultipleChoiceQuestion.py](#)) that represents subclass of a `Question`.
 - b. The class will store the additional attribute:
 - `choices`: the list of choices for the multiple choice question.
 - b. Your class should have **an `init()` method** that:
 - initializes the inherited data members to values passed as parameters, using the super class `init()` method
 - initializes the `choices` to the list passed as a parameter.
 - c. You should override the following inherited methods:
 - `displayQuestion()`: prints the question text followed by the list of choices, each separated by a newline.
 - `__repr__()`: returns the String representation of a `Question` (using inherited `str` method) followed by the list of choices. See sample run.

3. Write a class called `TrueFalseQuestion` (**`TrueFalseQuestion.py`**) that represents subclass of a `Question`.
 - a. The class will store the additional attribute:
 - `incorrectPoints`: the number of points to be deducted in case of a wrong answer.
 - b. 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.
 - c. You should override the following inherited methods:
 - `getScore()`: if the `studentAnswer` is correct return the question score (by calling the inherited `Question.getScore(self)`, otherwise return the negative incorrect points.
 - `displayQuestion()`: prints the text: 'True or False: ' followed by the question text.
4. Write an application, `Exam.py`, that includes the following functionality:
 - a. `initializeQuestions()`:
 - i. takes a `fileName` and an empty list as parameters.
 - ii. Using the data about Questions in the file, creates Questions/MultipleChoiceQuestions and adds them to the list passed as parameters. See the sample file below.
 - b. `gradeExam()`:
 - i. Takes a list of Questions as a parameter.
 - ii. Displays a header Grading Exam, see sample run for details.
 - iii. Scores each question and returns the total points, and the sum of the correct answers for all questions.
 - iv. For each question answered incorrectly, displays the questions with the heading 'Incorrect Answer'.(see sample run)
 - v. Displays a footer End of Grading, see sample run for details.
 - c. The program should do the following:
 - i. Read the questions from the file using the function defined above.
 - ii. For each question in the list, display the question and input the student's answer.
 - iii. Store the student answer for each question.
 - iv. 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 (multiple choice, True/False or regular), the text, the correct answer, and the points. If the question is a multiple choice question, it also contains the list of comma-separated choices. If the question is a true/false question, it also contains points to deduct in case of an incorrect answer.

T;Non-zero values map to False in Python?;False;5;3;
M;What is the largest ocean in the world?;B;5;A-Indian Ocean,B-Pacific Ocean,C-Atlantic Ocean;
R;In what year was Google launched on the web?;1998;5;
R;In computing what is Ram short for?;Random Access Memory;5;
M;What datatype is the following object: L = [1, 23, 'hello', 1]?;A;5;A - List,B-Dictionary,C-Array,D-Tuple;
T;Python is not a high level programming language?;False;5;2;
T;The # symbol can be places to the right of an executable statement ?;True;4;1;
M;Which of these in not a core datatype?;D;4;A - List,B-Tuple,C-Dictionary,D-Class;
R;Who invented Python?;Guido van Rossum;3;

Sample Run:

True or False:

Non-zero values map to False in Python?

Enter choice: T

What is the largest ocean in the world?

A-Indian Ocean

B-Pacific Ocean

C-Atlantic Ocean

Enter choice: B

In what year was Google launched on the web?

Enter choice: 2001

In computing what is Ram short for?

Enter choice: Random Mem

What datatype is the following object: L = [1, 23, 'hello', 1]?

A - List

B-Dictionary

C-Array

D-Tuple

Enter choice: A

True or False:

Python is not a high level programming language?

Enter choice: F

True or False:

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

Enter choice: True

Which of these in not a core datatype?

A - List

B-Tuple

C-Dictionary

D-Class

Enter choice: D
Who invented Python?

Enter choice: Guido

```
*****Grading Exam*****
Incorrect Answer
Non-zero values map to False in Python?
Your Answer:T
Correct Answer:False
Incorrect Answer
In what year was Google launched on the web?
Your Answer:2001
Correct Answer:1998
Incorrect Answer
In computing what is Ram short for?
Your Answer:Random Mem
Correct Answer:Random Access Memory
Incorrect Answer
Python is not a high level programming language?
Your Answer:F
Correct Answer:False
Incorrect Answer
Who invented Python?
Your Answer:Guido
Correct Answer:Guido van Rossum
*****END OF GRADING*****
Your score is: 13
```