# *Programming III (420-B31-HR)*

# *Assignment 1 – Quiz Taking Program*

Date assigned: Tuesday, August 30, 2016

Class diagram & test cases due: Tuesday, September 6, 2016

Code due: Monday, Sept. 19, 2016

***Objectives:***

After completing this assignment, the student should be able to:

1. Draw a class diagram.
2. Design test cases
3. Read data from a file.
4. Write data to a file.
5. Add to, find and traverse an ArrayList.
6. Use inheritance and override methods.
7. Create abstract classes.

***Problem Specifications:***

Develop a program to generate and take a quiz. The program takes quiz questions from a file named **quizQuestions.txt**, generates the quiz for the user to take and then checks the answers. The quiz score is then written to a file named **quizScores.txt**. You MUST use inheritance and an abstract class in your design.

The quiz consists of different kinds of questions:

1. Fill-in-the-blank
2. Single choice
3. Multiple choice
4. Numeric

For a fill-in-the-blank question, the question is provided with the answer surrounded by \_. The program should be case insensitive, and accept the answer whether it is lowercase or uppercase.

For a numeric question, if the user response and the answer differ by no more than 0.01 then the answer is correct.

The single choice and multiple choice questions can have any number of choices. (For example, one question may have 3 choices, another one may have 7 choices). Single choice questions have 1 correct answer. Multiple choice questions can have multiple correct answers.

An example **quizQuestions.txt** file is shown below. Each line in the file starts with the question type. The question type field has the following values:

* F for fill-in-the-blank
* S for single choice
* M for multiple choice
* N for numeric

If the question type field is S or M, then the question text field contains the number of choices for that question, followed by a list of the choices, separated by commas. (see sample file)

A question can display its text and it can check whether a given response is the correct answer.

Each time the quiz program is run, it should prompt the user to enter his or her name. At the end of the quiz, the program must inform the user of their score on the quiz, as a percentage. It must also write the user name and quiz score (in percentage) to the file named **quizScores.txt**. It should append the results to the end of the file. A sample run of the program is included below.

Your design must include the following:

1. Your program must store the quiz questions read in from the **quizQuestions.txt** file in an **ArrayList**.
2. Your program must store the choices for each choice question in an **ArrayList**.
3. Inheritance must be used. The root of the hierarchy must be a **Question** class, which is **abstract**.
4. You must have a **ChoiceQuestion** class which handles single choice questions, and a **MultiChoiceQuestion** class which inherits from **ChoiceQuestion**, and handles multiple answers.
5. The **Question** class must handle displaying the question to the **QuizRunner** class.
6. The **Question** class must handle checking whether an answer is correct.
7. A **QuizRunner** class must handle all input and output with the user. If you have any print’s or read’s in any other class of your program, then something is wrong.

***To Do:***

1. Draw a class diagram for the program using LucidChart. Make sure that all classes listed in the problem specification are included.
2. Generate a list of test cases to fully test the program. Each test case should describe the scenario, the input and the expected result.
3. Code the program and fully test the program for all error conditions described in the specification. You must use arrayLists, inheritance and abstract classes where specified in this assignment to obtain a passing grade.

***Marking Scheme:***

|  |  |  |
| --- | --- | --- |
|  | **Mark** | **Out of** |
| Class Diagram |  | 10 |
| Test Cases |  | 25 |
| Question class – uses ArrayLists, Inheritance, is abstract |  | 10 |
| Numeric Question code |  | 10 |
| Fill-in-the-blank Question code |  | 15 |
| Single choice question code |  | 15 |
| Multiple choice question code |  | 15 |
| File reading and parsing of quizQuestions.txt. |  | 15 |
| File writing of quizScores.txt |  | 10 |
| QuizRunner code – all input/output to the user is handled by this class. |  | 10 |
| Correct execution |  | 10 |
| Organization |  | 5 |
| **Total** |  | **150** |

***Organization Marks:***

Marks will be given for organization. This includes:

* naming files and folders according to the department standards
* giving meaningful names to variables, classes, objects and methods
* formatting and indenting Java classes using the Eclipse format tool
* submitting the assignment in correctly on **Moodle**
* including all required files in the submitted assignment folder
* using the same version of Visual Paradigm as the lab version for class diagrams.

***To be handed in:***

The following files should be included in a ***username*\_B31\_A01\_Quiz** folder and uploaded to **Moodle**:

1. The class diagram for the assignment in the file ***username*\_B31\_A01\_Quiz\_ClassDiagram.**
2. The test cases for the assignment in the file ***username*\_B31\_A01\_Quiz\_TestCases.**
3. The java project for the assignment. The project name should be ***username*\_B31\_A01\_Quiz**.

# Sample Run of Quiz Program:

Welcome to Heritage’s Quiz Program. Reading in questions from the file quizQuestions.txt

Please enter your name: Sandra

**Question**:

The winner of the silver medal in the mens 200m race in Rio was \_\_\_.

Your answer: Andre DeGrasse

Correct!

**Question:**

\_\_\_ was the Canadian flag bearer at the closing ceremonies in Rio.

Your answer: Penny Oleksiak

Correct!

**Question:**

Canada won a total of \_\_\_ medals at the Rio Olympics.

Your answer: 15

Incorrect!

**Question:**

How fast did Usain Bolt run the men’s 100m final in Rio?

Your answer: 9.8

Correct!

**Question:**

What is the Olympic Record in the men’s 100m sprint?

Your answer: 9.55

Incorrect!

**Question:**

What country won the most number of medals at the Rio Olympics?

1. Australia

2. Canada

3. China

4. United States

5. Great Britain

Your answer: 4

Correct!

**Question:**

What country won the most number of gold medals at the Rio Olympics?

1. China

2. United States

3. Great Britain

Your answer: 3

Incorrect!

**Question:**

Which countries were in the women’s bronze medal game for rugby 7s at the Rio Olympics?

1. China

2. United States

3. Great Britain

4. Canada

5. Germany

6. France

Your answer: 3,4

Correct!

**Question:**

Which countries medalled in women’s rugby 7s at the Rio Olympics?

1. China

2. United States

3. Great Britain

4. Canada

5. Germany

6. France

7. Australia

8. New Zealand

Your answer: 4,8,7

Correct!

**Question:**

Canada met its goal for number of medals at the Rio Olympics.

1. True

2. False

Your answer: 1

Correct!

Sandra, your score was 7 out of 10, or 70%.

Goodbye.

# quizQuestions.txt example file format:

F, The winner of the silver medal in the mens 200m race in Rio was \_Andre Degrasse\_.

F, \_Penny olexsiak\_ was the Canadian flag bearer at the closing ceremonies in Rio.

F, Canada won a total of \_22\_ medals at the Rio Olympics.

N, How fast did Usain Bolt run the men’s 100m final in Rio?, 9.81

N, What is the Olympic Record in the men’s 100m sprint?, 9.58

S, What country won the most number of medals at the Rio Olympics?, 5, Australia, incorrect, Canada, incorrect, China, incorrect, United States, correct, Great Britain, incorrect

S, What country won the most number of gold medals at the Rio Olympics?, 3, China, incorrect, United States, correct, Great Britain, incorrect

M, Which countries were in the women’s bronze medal game for rugby 7s at the Rio Olympics?, 6, China, incorrect, United States, incorrect, Great Britain, correct, Canada, correct, Germany, incorrect, France, incorrect

M, Which countries medalled in women’s rugby 7s at the Rio Olympics?, 8, China, incorrect, United States, incorrect, Great Britain, incorrect, Canada, correct, Germany, incorrect, France, incorrect, Australia, correct, New Zealand, correct

S, Canada met its goal for number of medals at the Rio Olympics., 2, True, correct, False, incorrect

# quizScores.txt example file format:

Player Name Result (Percentage)

Sandra 70%

Allan 55%

Sandra Stark 100%

Allan Mcdonald 75%

Richard 55%