COMP 1111 Project 2 / Fall 2022

Deadline: 30 December 2022 (23:59 PM)

1. This is a **strictly individual** assignment. That means, you **are not allowed** to take a peek at any solutions, including online resources, and you **are not allowed** to share your answers with anyone, including your classmates. **Never show or share your code (as a whole or code pieces) to your friends (personally or via a messenger such as WhatsApp). Do not write your program together with your friend or relative.**
2. In case of any form of copying and cheating on programs, all parties will get **no** project contribution to their grading and **disciplinary procedure** will be executed!
3. Failure to follow these rules will result in an F for the course grade, in the best case.

4. You should use if/if-else or switch, loops (while/for), and methods in your solution.
5. Use **Blackboard** to submit your implementation of your project.
6. You **must submit your project as a single java file**.
7. In order to validate your grade, you must present your work to your lab tutor on the lab date/hour that is determined for the project presentations. Projects without presentations will not be graded.
8. The neatness, indentation of your code does matter. It should be clear and easy to read. You may lose points for non-commented code.

An Arithmetic Exercise Program

In this project, you will design and implement a test application to help users to improve their arithmetic calculation skills. The aim of the program is to solve maximum number of questions correctly in a limited time. The application must generate random arithmetic expressions of two and three operations with random integer operands and then prints the question and gets the answer from the user. If the user correctly writes the answer, the program generates the next random question until the time finishes. Use the following rules to implement your program. **The program must be modular and use methods for subtasks**. Include at least 7 methods in your program.

1. You should use only `System.currentTimeMillis()` for keeping track of time.
2. Give initial time of 1,5 minute and increase the total time by 5 seconds if 5 questions in a row are correct
3. Implement two levels for the game:
   a) First level uses one operation with two operands only, e.g. `5 + 3 = ?`
   b) Second level uses two operations with three operands , e.g. `20 / 4 + 5 = ?`
4. At the end of the program calculate and show the score by grading total number of correctly answered questions. The program also must display the total time that is elapsed and number of correct answer/questions. You can provide motivational messages such as in the sample run given at the e-next page.
5. Print a star pattern (as shown on the sample run) when user answers `3xk` questions in a row where k = {1, 2, 3, 4, 5, …}. When the size of the stars gets bigger than allowable number of characters in a row of the output screen, resize your stars with this formula (3xk) / 4 (this will be the number of starts in the last row of the triangle)
6. According to the score of the user, put a threshold to decide whether the user can advance to the next level or repeat the current level.
7. At the end of the test, ask the user if he wants to repeat the level or advance to the next level (if he has enough points), or quit the program.

See next page for a sample output of the program.

Here is a sample run of the program:

```
Welcome to Arithmetic's Exercise Program
_____________________________________

You have 90 seconds to answer as many questions as possible.
You will get 5 seconds bonus if you answer 5 questions in a row.
Use java arithmetic precedence rules to find answers!
Press' q 'to quit or any key to start…

Q1              5 + 6 * 9 = 59              Correct
Q2              2 - 6 * 0  =  2             Correct
Q3              3 / 8 + 5  =  5             Correct

***good***
*** *** ***
 **  **  **
  *   *   *

Q4              8 / 2 - 4  =  0             Correct
Q5              9 * 12 + 0 = 96             Correct  (you won 5 secs.)
Q6              52 - 12 + 13 = 53           Correct

******              very good              ******
****** ****** ****** ****** ****** ******
 *****  *****  *****  *****  *****  *****
  ****   ****   ****   ****   ****   ****
   ***    ***    ***    ***    ***    ***
    **     **     **     **     **     **
     *      *      *      *      *      *

Q7              5 + 1 * 9 = 59              Wrong
Q8              2 - 2 * 0  =  2             Wrong
Q9              3 / 1 + 5  =  5             Wrong

TIME IS UP!

You are as fast as a turtle!
Correct Answers: 6
Total Questions: 9
Total Time: 95 sec
Sorry!!! You cannot advance to the next level !

Input 'q 'to quit or any key to restart…

Q1              5 / 5 + 2  = 3              Correct
Q2              3 * 4 - 2  =  10            Correct
Q3              3 * 7 * 5  =  100           Wrong
Q4              2 + 7 / 3  =  5             Wrong
Q5              .......
```