**Nassau Community College** **Summer I 2016**
**CSC 120 CA: Computer Science I** **Prof. Christopher R. Merlo**

**Project #4: Math Quiz Part 2**
Out: Wednesday, 8 June 2016
Due: Monday, 13 June 11:59:00 pm

Please help NCC conserve resources by not printing this document on campus.

Please note that you are meant to work on this assignment yourself.

# 1 Objectives

- To use your `Question` class from Project 3 to write a math game for first graders
- To practice writing application code that uses a data-type class
- To add an accessor method to the `Question` class

# 2 Overview

In Project #3, you wrote and tested a `Question` class as the first part of a project for an elementary school to help first graders practice arithmetic. Specifically, the skills that students were to practice are:

- Addition of integers $i + j$ where both $i$ and $j$ are in the range 0 to 12
- Subtraction of integers $i - j$, where $6 \leq i \leq 12$ and $0 \leq j \leq i$

The `Question` class you wrote was supposed to have generated all possible addition and subtraction questions in those ranges. If you didn't complete all the required tasks for the `Question` class in Project 3, you will have to complete them now to write Project 4.

In Project 4, you will create an application that asks a student 15 arithmetic questions, and reports a score for addition, a score for subtraction, and an overall score.

# 3 Specifications

- Open your Project 3 Eclipse project again, and add the class `Project4App` to it. Make sure all classes have proper comments at the top.
- Display an input dialog box with a question in it, and prompt the user for an answer. See Figure 1 on page 2.

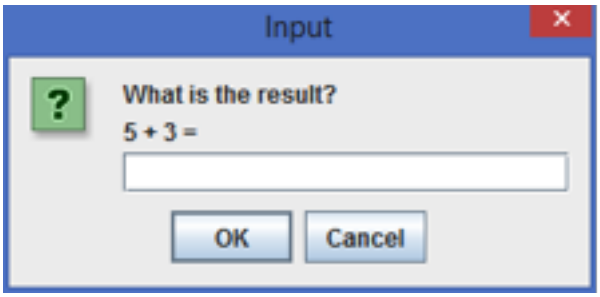


Figure 1: Question

- After the player has entered an answer, determine whether the answer is correct and inform the player using a *message box*. Display a message box like the one in Figure 2 on page 2 if the student's answer was correct, and display a message box like Figure 3 on page 2, that shows what the correct answer is, if the student's answer was not correct. Note the use of `JOptionPane` to create a message box:

```
1 JOptionPane.showMessageDialog( null, "Hello World!" );
```

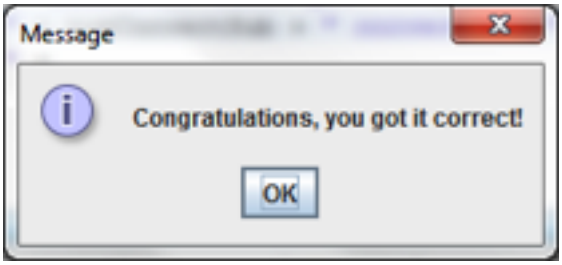


Figure 2: Correct Answer

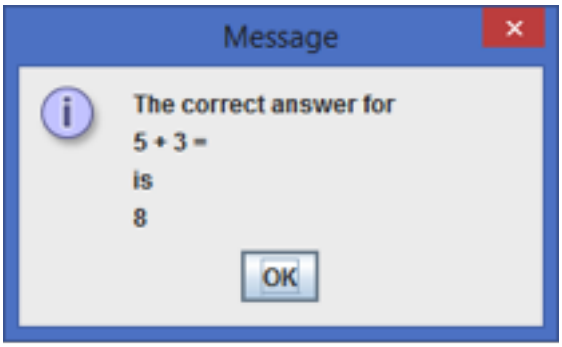


Figure 3: Incorrect Answer

- Once a question has been created, you will need some way to determine whether it is an addition question or a subtraction question. Add an accessor method to the `Question` class to provide this functionality to the `Project4App` class.
- After fifteen questions, report how many addition questions the student got right

and wrong, and report how many subtraction questions the student got right and wrong. Also calculate and display a grade for the quiz. See Figure 4 on page 3.

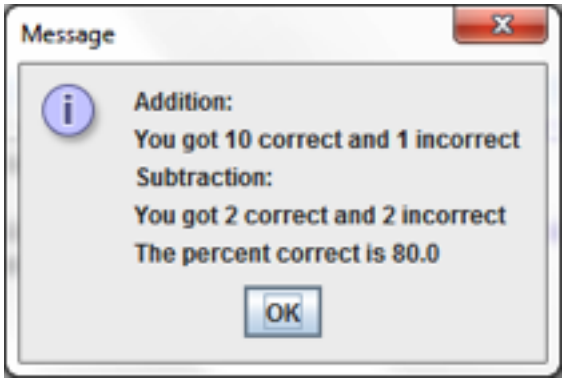


Figure 4: Grade Summary

# 4 Analysis

In addition to your source code, you must submit a plain text file called `analysis.txt` that contains your answers to the following questions:

- How much time did you spend working on this project?
- Who, if anyone, helped you with this project?
- What was the most difficult part of this project?
- Describe how you convinced yourself that your program works.

Your responses to these questions will be graded based upon grammar and spelling as well as on content. Please use complete sentences.

# 5 Submitting Your Project

You must submit your project using the interface on my web site:

http://www.matcmp.ncc.edu/~cmerlo/

No other submissions will be accepted. You may re-submit this project as often as you want; I will only ever see the most recent submission. Notice this means that if you submit before the deadline, and then re-submit after the deadline, your project will be late, and you will lose lateness points. You must submit the following files:

- `Question.java`
- `Project4App.java`
- `analysis.txt`

# 6 Assessment

It is clearly important that your program runs successfully. That is why **30%** of your grade will be based on the **correctness** of your program.

However, it is also important to write code that conforms to the rules we programmers have imposed upon ourselves, to ensure readability. **Ten percent** of your grade will be based, therefore, on your adherence to the **style guidelines** listed on my web site.

Additionally, **proper testing and proper analysis** are the tools we use to convince non-programmers that our code works. Therefore, **ten percent** of your grade will be based on your analysis.

Finally, you will take a short quiz at the end of class on the day of the deadline. The answers to this quiz will account for **50%** of your grade. You will be allowed to refer to a printout of your code during the quiz. This printout ***must*** be of your submission for `Question.java`, and it ***must*** contain your name in the comments. It is ***strongly*** suggested that this printout include line numbers.

# 7 Things You Should Know

- As with previous projects, you may help each other, but **you are not permitted to share code.** Not even one line. If you're going to talk about this project with each other, leave the conversation empty-handed, and then write the code on your own. Submitting another student's code, or allowing another student to submit yours, will automatically earn both of you a zero on this assignment. Remember that earning a zero due to academic dishonesty also disqualifies you from withdrawing from the class.
- This project is due at 11:59:00 pm on June 8th. Late projects lose 10 points per 24 hour time period or portion thereof, starting at 11:59:01 on June 8th, regardless of weekends, holidays, weather, computer malfunction, etc. Any submissions uploaded after 11:59:00 pm on Saturday, June 11th will be ignored, and a grade of 0 will be recorded.
- Store your data in multiple places. Consider using a system like Dropbox (http://www.dropbox.com/) or SpiderOak (http://www.spideroak.com/). (If you decide to use Dropbox, let me invite you; we both earn an extra 0.25 GB of free space.)

# 8 Extra Credit

If your program earns a grade of 45 (before the quiz) or better, then you may earn ten extra credit points if the quiz adapts to the student. If the student gets the first ten questions right, end the quiz. Otherwise, continue the quiz until either the student's average is 80% or better, or until 25 questions have been asked.

You ***must*** comment the code you write for extra credit, clearly marking it as extra credit code (as well as describing what it does), and you ***must*** also indicate that you're seeking extra credit points in your analysis file.

There will be no parial extra credit.