CSCI 2300, Spring 2019

Homework 3 [60 points]

Overview

In this homework, you will apply the concepts you learned in class to reinforce your understanding of:

- Java SWING API layout
- Java SWING event handling
- Single Responsibility Principle
- Program design
- Object Oriented Principles: abstraction, generalization, encapsulation

Description

In this assignment, you will be implementing an arithmetic quiz application with a Graphical User Interface (GUI) using Java SWING API. Below is a list of requirements that your application must implement.

Requirements

R1. [10 points] When application starts, user is presented with an arithmetic problem. An example prototype showing the initial state of the application is below:

*			×
	5 + 72		
	Submit	a an a	

R2. [2 points] Valid arithmetic problems are:

- (a) Addition of two integers
- (b) Subtraction of two integers

R3. [3 points] Integers used in the arithmetic problem are in the range [0, 100).

R4. [5 points] Arithmetic problems are randomized (so not hard coded, not read from a file) in terms of:

- (a) Operator used (addition or subtraction)
- (b) The two arguments (the integers being added or subtracted)

R5. [2 points] The user can type in the answer in the space provided.

R6. [3 points] The user can submit the answer by clicking the "Submit" button.

R7. [5 points] If the user submits the correct answer, he/she will see an announcement that the answer is correct, with an option to look at a new question. An example prototype is shown below:

2		×
Correct!		
New Question		

R8. [5 points] If the user submits an incorrect answer, he/she will see an announcement that the answer is wrong, with an option to try again or to look at a new question. An example prototype is shown below:

	×
-	

R9. [5 points] If the user selects to look at a new question, a new arithmetic problem is generated and presented to the user (as in requirement R1).

R10. [5 points] If the user clicks the "Try Again" button, he/she is presented with the last question that was solved incorrectly.

Additional Information

To randomize your arithmetic problems, you can use any random number generator you wish. One of the options is to use:

```
java.util.Random: https://docs.oracle.com/javase/7/docs/api/java/util/Random.html
```

The nextInt(int n) method of this class returns an random integer in the range [0, n)

Example:

```
import java.util.Random;
Random rand = new Random();
// get a random integer in the range [0, 100)
```

int x = rand.nextInt(100);

You can get the text that user typed in by calling: String text = answerField.getText();

You can convert String text to an integer value by calling:

```
Integer answer = new Integer(text);
```

Grading

Your grade will be determined based on the following criteria:

[45 points] Did you implement all the requirements (specific points associated with each requirement are included in the Requirements section).

[5 points] Does your code adhere to CSCI 2300 coding standards?

[5 points] Does your solution avoid code duplication?

[5 points] Does each class in your code have single responsibility (only one reason to change)?