Module 3 - Selections

CMPT220L
Due on Sep 25, 2020 by 11:59PM
Points: 100

Problems

1. *(Reduce fractions)* Write a program that prompts the user to enter the numerator and denominator of a fraction. The program determines whether the number is a proper fraction or an improper fraction. If it is a proper fraction, display the number. If not, reduce it to a mixed fraction or to an integer.

   Here are sample runs:

   ```
   Enter a numerator: 45
   Enter a denominator: 46
   45 / 46 is a proper fraction

   Enter a numerator: 45
   Enter a denominator: 15
   45 / 15 is an improper fraction and it can be reduced to 3

   Enter a numerator: 45
   Enter a denominator: 25
   45 / 25 is an improper fraction and its mixed fraction is 1 + 20 / 25
   ```

2. *(Slope-intercept form)* Write a program that prompts the user to enter the coordinates of two points (x_1, y_1) and (x_2, y_2), and displays the line equation in the slope- intercept form, i.e., $y = mx + b$. For a review of line equations, see `http://www.purplemath.com/modules/strtlneq.htm`. m and b can be computed using the following formulas:
   $m = y_2 - y_1/x_2 - x_1 \qquad b = y_1 - mx_1$
   Don't display m if it is 1 and don't display b if it is 0.

   Here are sample runs:

   ```
   Enter the coordinates for two points: 1 1 0 0
   The line equation for two points (1, 1) and (0, 0) is y = x

   Enter the coordinates for two points: 4.5 -5.5 6.6 -6.5
   The line equation for two points (4.5, -5.5) and (6.6, -6.5) is
    y = -0.47619x - 3.35714
   ```

3. *(Random point)* Write a program that generates a random point inside a circle. The circle is centered at (0, 0) with a radius 5. Display the point and its distance to the center.

   Here are sample runs:

   ```
   The point is (-3.3878721143708708, 3.1409080280010944)
   and its distance to the center is 4.619846393950072

   The point is (-0.14972878708817536, 4.986535034124079)
   and its distance to the center is 4.9887824522852995
   ```

4. *(Random response message)* Modify the subtraction quiz in Listing 3.3 to display one of the following messages (excellent, correct, way to go) randomly if the student gives a correct answer and display one of the following messages (incorrect, wrong, not right) randomly if the student gives an incorrect answer.

   Here is a sample run:

```
What is 7 - 0? 7
way to go

What is 4 - 2? 2
correct

What is 6 - 4? 2
excellent

What is 7 - 3? 3
incorrect
7 - 3 should be 4

What is 3 - 2? 2
wrong
3 - 2 should be 1
```

Submission

Make sure you create one Java file per project. Place your `.java` files under the corresponding folder in your local copy of the GitHub repository, commit and push it to the remote repository. Make sure that the professor has access to the repository (`jfac65-marist`).

```
cmpt220lastname\
   hw\
      3\
         Problem1.java
         Problem2.java
         Problem3.java
         Problem4.java
```