Lab Assignment 5

In this assignment you are to write a program to solve the following problem. As with all lab assignments, remember the following submission steps:

- Make sure your code passes at least all the provided JUnit tests
- Save, commit, and push all code changes
- Confirm the latest code is visible via the "Files" section of your repository website
- Confirm that the repository is private, and that the instructor has Developer access
- Note: you do **NOT** need to document your code

Problem a (`LA5a.java`)

Write a program that works with fractions. You are first to implement three methods, each to perform a different calculation on a pair of fractions: subtract, multiply, and divide. For each of these methods, you are supplied two fractions as arguments, each a two-dimensional array (the numerator is at index 0, the denominator is at index 1), and you are to return a resulting, simplified fraction as a new two-dimensional array (again, with the numerator at index 0, and denominator at index 1). You have been provided an **add** method as an example. You must compute the resulting fraction using fraction-based math (working with numerators and denominators) – do **not** convert the fractions to double values (like 1.5), do the math, and convert back to a fraction. You have been provided a method to simplify a fraction using the **gcd** method a previous last lab. As a reminder for fraction arithmetic…

$$\frac{n_1}{d_1} + \frac{n_2}{d_2} = \frac{n_1 d_2 + n_2 d_1}{d_1 d_2} \qquad \frac{n_1}{d_1} - \frac{n_2}{d_2} = \frac{n_1 d_2 - n_2 d_1}{d_1 d_2} \qquad \frac{n_1}{d_1} \times \frac{n_2}{d_2} = \frac{n_1 n_2}{d_1 d_2} \qquad \frac{n_1}{d_1} \div \frac{n_2}{d_2} = \frac{n_1 d_2}{d_1 n_2}$$

Once the operation methods are complete and pass the JUnit tests, now focus your attention on the **main** method. You first need to input the two fractions from the keyboard (numerator then denominator for each; you can assume integers) as well as one of the four valid operations (+, -, *, /). Then validate the inputs: make sure a valid operation was input, make sure neither of the denominators are zero, and make sure that the numerator of the second fraction isn't zero if the operation is division (error messages have been provided for each of these situations). Finally, compute the result of the operation and output the answer. Note that if the denominator of the answer is 1, you should just output the numerator (this includes if the answer is 0). Here are two example runs of the program:

```
Enter the numerator for the first fraction: 1
Enter the denominator for the first fraction: 2
Enter the numerator for the second fraction: -4
Enter the denominator for the second fraction: 8
Enter the operation (+, -, *, /): +
1/2 + -4/8 = 0

Enter the numerator for the first fraction: 7
Enter the denominator for the first fraction: 8
Enter the numerator for the second fraction: 1
Enter the denominator for the second fraction: 3
Enter the operation (+, -, *, /): -
7/8 - 1/3 = 13/24
```