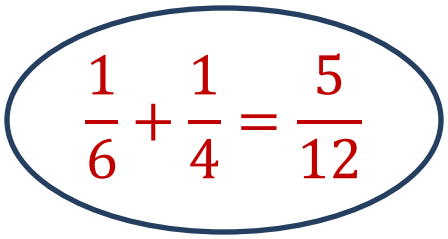
Practice Exercise #11: Fraction

http://www.comp.nus.edu.sg/~cs1020/4_misc/practice.html



Reference: Week 3 OOP Part 2

Objectives:

1. Object-Oriented Programming
2. Writing user-defined class

Task statement:

Write **Fraction.java** to define a **Fraction** class which contains the following attributes:

- **private int numer;** // numerator
- **private int denom;** // denominator

Your class is to provide the following constructors:

- Default constructor **Fraction()** to create a fraction **1/1**
- Alternative constructor **Fraction(int, int)** where the parameters are the numerator and denominator. You may assume that the denominator is always positive.

Your class is to also provide the following methods (and other methods if necessary)

- **simplify()** to return the simplified form of "this" object.
  - Example: If the method is applied to fraction 3/12, then it returns the simplified fraction ¼ .
- **add(Fraction f)** to add "this" object with f and return the sum of the two fractions, in simplified form.
- Overriding methods **equals()** and **toString()**

You may want to include a method **gcd(int a, int b)** to compute the greatest common divisor of a and b, and make this method private access. (Why?)

A client program **TestFraction.java** is provided, and should not be modified. It does the following:

- Read data to create 2 Fraction objects
- Check if the 2 fractions are the same (use **equals()**)
- Add the 2 fractions to create the sum, which should be converted to simplified form if necessary (use **add()** and **simplify()**)
- Display the sum (use **toString()** implicitly)

You must define your **Fraction** class such that running **TestFraction** produces the same output as the sample runs shown on the next page.

Sample run #1:

```
Enter 1st fraction: 2 20
Enter 2nd fraction: 3 30

1st fraction is 2/20
2nd fraction is 3/30
The fractions are the same.
Sum is 1/5
```

Sample run #2:

```
Enter 1st fraction: 0 8
Enter 2nd fraction: 6 14

1st fraction is 0/8
2nd fraction is 6/14
The fractions are not the same.
Sum is 3/7
```

Sample run #3:

```
Enter 1st fraction: 1 10
Enter 2nd fraction: -5 10

1st fraction is 1/10
2nd fraction is -5/10
The fractions are not the same.
Sum is -2/5
```

Sample run #4:

```
Enter 1st fraction: -2 5
Enter 2nd fraction: 14 6

1st fraction is -2/5
2nd fraction is 14/6
The fractions are not the same.
Sum is 29/15
```