Fraction Arithmetic Lab

1. **Create a class called `Fraction` for performing arithmetic operations with fractions.**

The following are the fields and methods that the Fraction class is to support. Make sure that you adhere to the Java naming conventions.

Fields

- n (int)
- d (int)

Do not allow a denominator of 0. Print an error message: `Denominator is zero!`

Methods

- get and set methods for each of the fields (**`getDenominator()`**…….)
- default constructor (creates a fraction with n=0 and d=1)
- constructor that takes the two fields and initializes them (make sure it simplifies the fraction if necessary)
- add (adds two fractions and returns the result as a new fraction)

```
public Fraction add (Fraction aFraction) { ... }
```

// You want to add one fraction from the call to the Fraction in the argument. Make sure that the content of the argument does not get changed! All the operations are similar. Don't forget to simplify the results!

- **`subtract`** (subtracts two fractions; see add method)
- **`multiply`** (multiplies two fractions; see add method))
- **`divide`** (divides two fractions; see add method))
- **`toString()`** (returns a string of the form a/b where a is the numerator and b is the denominator)

Hint: What are you going to return if the fraction is 5/1, or 0/2?

```
public String toString() { ... }
```

- **`public boolean equals (Fraction aFraction) { ... }`** tests if two fractions are equal. (**Make sure you simplify first)**

- **`double decimalValue()`** returns the decimal value of this fraction

- **`int gcf(int n1, int n2)`** returns the GCF of two integers

- **`void simplify()`** reduces this fraction by dividing both the numerator and denominator by their GCF

2. **Create a class called FractionTester for testing your Fraction class.**

   Make sure to test the following Fractions:

```
Fraction f1 = new Fraction(1, 2);
Fraction f2 = new Fraction(3, 6);
Fraction f3 = new Fraction(3, 7);
Fraction f4 = new Fraction(1, 5);
Fraction f5 = new Fraction(1, 6);
Fraction f6 = new Fraction(0, 7);
Fraction f7 = new Fraction(10, 5);
Fraction f8 = new Fraction(0, 8);
Fraction f9 = new Fraction(2, 5);
```

   Think of some additional fractions to test.

   Make sure to label all the outputs!