CS565 Homework Problem 1

Copied from Deitel Java How to Program p357: 8-15

8.15 (Rational Numbers) Create a class called **Rational** for performing arithmetic with fractions. Write a program to test your class. Use integer variables to represent the private instance variables of the class – the numerator and the denominator. Provide a constructor which enables an object of this class to be initialized when it is declared. The constructor should store the fraction in reduced form. The fraction

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Is equivalent to ½ and would be stored in the object as 1 in the numerator and 2 in the denominator. Provide a no-argument constructor with default values in case no initializers are provided. Provide public methods which perform each of the following operations:

1. Add two rational numbers: The result of the addition should be stored in reduced form. Implement this as a static method.
2. Subtract two rational numbers: The result of the subtraction should be stored in reduced form. Implement this as a static method.
3. Multiply two rational numbers: The result of the multiplication should be stored in reduced form. Implement this as a static method.
4. Divide two rational numbers: The result of the division should be stored in reduced form. Implement this as a static method. (JM: What do you do about division by zero.)
5. Return a **String** representation of a **Rational** number in the form a/b, where a is the numerator and b is the denominator.
6. Return a **String** representation of a **Rational** number in floating-point format. (Consider providing formatting capabilities that enable the user of the class to specify the number of digits of precision to the right of the decimal point.)