CSC 330 PROJECT 1 DUE: 2/20/2014

Rational fractions are of the form *a / b ,* where *a* and *b* are integers and *b ≠ 0*. Suppose *a / b* and *c / d* are fractions.

**Arithmetic operations on fractions are defined by the following rules:**

*a / b + c / d = (ad + bc) / bd*

*a / b - c / d = (ad - bc) / bd*

*a / b \* c / d = ac / bd*

*(a / b) / (c / d) = ad / bc,* where *c/d ≠ 0.*

**Fractions are compared as follows:**

*a / b* *op* *c/d* if *ad op bc*, where *op* is any relational operator. For example, *a/b < c/d* if *ad < bc*.

**1.** Create a class, called Rational, for performing arithmetic and relational operations on fractions.

Use integer variables to represent the private instance variables of the class – the numerator and the denominator.

Provide a constructor method that allows an object of this class to be initialized when it is declared. The constructor should store the fraction in reduced form (i.e. the fraction 2/4 would be stored as 1 in the numerator and 2 in the denominator). Provide a no-argument constructor in case no initializers are provided.

a) Overload the arithmetic operators ( +, -, \*, / ) , so that the appropriate symbol can be used to perform these operations. The result of each operation should be in reduced form.

b) Overload the relational operators ( <, <=, >, >=, ==, != ) , so that the appropriate symbol can be used to perform these operations.

c) Overload the stream insertion and stream extraction operators for input and output.

**2.** Write a C++ program that, using the Rational class, performs operations on fractions. Test your class

thoroughly.