Rational Numbers

A *rational number* is a number expressed as an integer numerator and denominator. Their importance in computation is due to the fact that they can be represented exactly in a binary fixed point representation. To maintain that exact representation all arithmetic operations must be performed in integer format. You cannot convert the numbers to real, do the math, then convert them back to rational. A further description and formulas for arithmetic operations can be found here: [WIkipedia]. Note that division by 0 must throw a char* exception such as "divide by 0".

The Problem

Convert your Java program to represent a rational number to C++. The C++ class is also called **`RationalNumber`** but there is no interface to implement. Include all functions and constructors from the Java implementation and add a destructor. Parameters specified as RationalNumberInterface in Java will become RationalNumber & (reference to RationalNumber) in C++. You may include the const designator if you so choose. For example:

```
RationalNumber RationalNumber::div(const RationalNumber& rhs) const
```

Include **`void setNumerator(int n)`** which assigns the numerator and **`void setDenominator(int n)`** which assigns the denominator and throws a char* exception of n is 0. These functions were not included in the Java version of the assignment.

You may include any additional **`private`** member functions and variables as needed.
Test your program with the TestRationalNumber file provided. You may not alter this class.

Notes

To call the square root function provided by C++ libraries (equivalent to Java Math.sqrt(x) use

```
#include <cmath>
…
double sqr = std::sqrt(x);
```

Deliverables

1. Source code attached to assignment in Blackboard
    a. RationalNumber.cpp and RationalNumber.h files
2. A text document in PDF format (do not use any other format), that contains
    a. A reflective essay on your successes, difficulties, and how you tested your code to ensure correctness
    b. Screen shot of the running program