CS213: Programming II
Assignment 1

Objectives

1. Learning and practicing basics of OOP
2. Problem solving and teamwork

Description

Data types like **`int`** and **`float`** exist in C++ and other languages. They are limited by minimum and maximum values. Sometimes we need to extend the bounds of those types to hold longer numbers. Java solves this problem by providing **`BigInteger`** and **`BigDecimal`** classes. In this assignment, it is required to develop a new type that can hold unlimited decimal integer values and performs arithmetic operations on them. Your task is to develop in C++ a class, **`BigInt`**, that supports using extremely long integer values like these:

```
BigInt number1("1020304450607780901234567890 10");
BigInt number2("13579246802242678901202345 6701");
BigInt number3 = number2 + number1;
BigInt number4 = number2 - number1;
cout << " number1 = " << number1 << endl;
cout << " number2 = " << number2 << endl;

//237822913083204879135480245711
cout << " number2 + number1 = " << number3 << endl;

//337620229616486988885666676 91
cout << " number2 – number1 = " << number4 << endl;

//337620229616486988885666676 92
cout << " number4 = " << number4++ << endl;

//237822913083204879135480245710
cout << " number4 = " << number3-- << endl;
```

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Your task is:

(1) Design the class **`BigInt`** that has the following operators:

```
BigInt (string decStr); // Takes string
BigInt (int decInt); // Takes integer
BigInt operator+ (BigInt& secondNumber);
BigInt operator- (BigInt& secondNumber);
BigInt operator++ (int);
BigInt operator-- (int);
Bool operator==(BigInt& secondNumber);
Bool operator!=(BigInt& secondNumber);
Bool operator>(BigInt& secondNumber);
Bool operator<(BigInt& secondNumber);
ostream& operator<<(ostream& out, const BigInt& number);
istream& operator>>(istream& in, BigInt& number);
```

(2) Implement the class **`BigInt`**

(3) Write five test cases to test it

(4) Implement a **`main`** that runs the test cases and verifies the results

(5) Give the user the choice whether to load data from file or to give it as input and whether the output on console or on file

(6) **(Bonus)** Allow the user to enter either positive or negative numbers.

Deliverables

1. ID1_ID2__Ass#1.rar Compressed file contains all the assignment files
2. BigInt.cpp
   BigInt.h
   main.cpp
3. TestCases.pdf File contains the testcases input and output

Deadline

- Assignment will be delivered in teams of two by 7/11/2017 at 11:55 pm on Acadox.
- No Assignment will be accepted by any way other than Acadox.