CS 271/462
Programming Assignment 10

You are expected to read Chapter 18 before beginning this assignment.

40 points total

Submit 4 files (don't zip them):

1. makefile
2. Term.h
3. Term.cpp
4. TermTest.cpp (this is the driver program)

> Programs must compile.
> Programs that have syntax errors receive a grade of zero.

Your submission will be graded on how well:

- the programs follow the course documentation and style guidelines.
- the programs follow the conventions for naming variables and functions.
- the class definition and implementation match the specifications.
- the driver program tests all functions of the class.

These things are prohibited:

- scanf and printf
- \n and \t
- C libraries
- std::

Reading: Chapter 16, 17, 18

Grading:

Documentation & Style (indentation, spacing, etc)	3 points
makefile	5 points
Term.h - most of this file is given to you.	2 points
Term.cpp - Function definitions for (2 points each)	
Constructor	2 points
2 Accessors	4 points
2 Mutators	4 points
7 Overloaded Operator Function Definitions (2 points each)	14 points
`<<` `>>` `+` `-` `*` `++ (prefix)` `++ (postfix)`	
TermTest.cpp	6 points
Total possible	40 points

Makefile

Write a makefile to compile all programs and create an executable called TermTest.

Documentation and Style

Documentation is required. This includes header comments as well as inline comments in all functions. Every right curly brace must have a comment.

The Term Class

The Term class represents a term in a polynomial such as $2x^4$ or $9x^2$.

For the purpose of this assignment:

- Adding Terms can only be done if the exponents are the same. $ax^n + bx^n = (a+b)x^n$
- Subtracting Terms can only be done if the exponents are the same. $ax^n - bx^n = (a-b)x^n$
- If the exponents aren't the same, the addition and subtraction operators should return a Term with 0 as the coefficient and 0 as the exponent.
- Multiplication $ax^m * bx^n = (a*b)x^{(m+n)}$
- Output a term in the customary format, using ^ to indicate the exponent (instead of a superscript).

  `2x^4` or `9x^2`

Here is the Term Class definition:

```
class Term
{
    friend ostream &operator<<( ostream &, const Term & );
    friend istream &operator>>( istream &, Term & );

    private:
       int coefficient;
       int exponent;

   public:
      Term ( int coef = 0, int exp = 0 );
      Term& setCoefficient ( int );
      Term& setExponent ( int );
      int getCoefficient () const ;
      int getExponent( ) const ;
      Term operator+ (const Term & ) const;
      Term operator- (const Term & ) const;
      Term operator* (const Term & ) const;
      Term& operator++( );  // prefix increment
      Term operator++( int );  // postfix increment
};
```

- Place the Term class definition in Term.h. Include a preprocessor wrapper with the symbolic constant TERM_H.

- There are 10 members functions and 2 non-member functions. Write the 12 function defintions in a file called Term.cpp.
- Mutators must return the calling object.
- Write a test program called TermTest.cpp.
- Your test program should contain statements such as:

```
Term k(2, 3);
Term r;
cin >> r;
cout << "the sum of k and r is " << (k + r) << endl;
```

- Make sure you have at least one test call to each member function and each non-member function.
- Write a makefile to compile all programs and create an executable called TermTest.