University of Wyoming
COSC 1030
Computer Science I

Program 10
More Work With Classes

1 Purpose

In this homework, you are going to develop a C++ class to describe and manipulate polynomials.

2 Procedure

I have provided a basic testing program, **TestThePoly.cpp**, and a header file, **Polynomial.hpp**, for a polynomial class named **Polynomial**. Your job is relatively easy: complete the class declaration in the header and then implement (in a matching .cpp file) the functions that are declared in the header file and test them to ensure they work as advertised.

The testing program supplied is very basic. You will be expected to **modify** it and add some (two or three at least) more tests to ensure that all aspects of the new class are exercised.

For those who may be confused, the "degree" of a polynomial is the highest degree (exponent) of its terms. For instance

$$4x^3 + 3x^2 + 0.3x - 1.54$$

is a polynomial of degree 3. Note: In this example there is one more term than the degree of the polynomial. Further note: There is always one more term than the degree of the polynomial. Some of the coefficients (multipliers) of the terms may simply be 0.

1. The declaration should match the interface shown in the provided incomplete header file **Polynomial.hpp**. Please understand that the actual structure of the private members and functions of this class are up to you to design. Also, the degree of the polynomial can be any non-negative integer value (from 0 up to "the sky is the limit").

2. The behavior of the class and its methods should duplicate that shown by the example test application **TestThePoly.cpp**. Its associated program output is at the end of this file.

3. You can download the two files from WyoCourses.

4. Upload your solution to the WyoCourses site, **Program 10 assignment**.

5. Your solution should consist of exactly 4 files:

   (a) A C++ header file, **Polynomial.hpp**, which contains the completed declaration for the class **Polynomial**. Remember to change the file's header to contain the correct information about you, your section, date completed, etc.

   (b) A new C++ source code file, **Polynomial.cpp**, which contains the required function definitions for the class *Polynomial*.

   (c) A C++ source code file, **Prog10.cpp**, that is a modified version of *TestThePoly.cpp* that was supplied. Again, do not forget to correct the header and add enough more tests to ensure that everything works.

   (d) A single text file, **Prog10Test.txt** which contains demonstration dialog of your class and main program's behavior.

Example results from "TestThePoly.cpp". Note that we cannot write something like x^2 so instead we write `x^(2)`.

```
buckner ~...prog10/solution> TestThePoly

(1) Testing 'cout << A':  empty
(2) Testing 'cin >> A':
Enter the polynomial (integer degree then double coefficients):
         3 -1 2.09 -5.3 -0.98

(3) Second look at A:  -1x^(3) +2.09x^(2) -5.3x^(1) -0.98
(4) Testing 'Polynomial B(A)':  -1x^(3) +2.09x^(2) -5.3x^(1) -0.98
(5) Testing 'Polynomial C(2, clist)':  +8x^(2) +4.5x^(1) +1
(6) Testing D = C:  +8x^(2) +4.5x^(1) +1
(7) Testing A == B :  TRUE
(8) Testing A == D :  FALSE

buckner ~...prog10/solution>
```