Northwestern University
Department of Electrical Engineering and Computer Science

Programming Assignment 3

EECS 231 Advanced Programming
Fall Quarter 2006

Due : Monday 10/30/06 at 11:59pm

There are 2 pages to this handout

Goals of this assignment

- Practice class creation and operator overloading

Problem description

Complete problem 11.17, p. 629.

Name your class `Polynomial`. It should represent polynomials in one variable (assumed to be x).

The array of terms should be implemented as a pointer (not a static array). Initialize it to NULL in the default constructor.

Do not forget to provide a copy constructor.

Set and get functions are not needed.

In addition to the operators described in parts (a)-(e), you should:

(f) Overload the stream extraction operator. You may assume that the input will be in pairs of values (power followed by coefficient), for terms with non-zero coefficients, and in descending order of power. This means that the very first power to be read is the order of the polynomial. For example, the input for polynomial $x^3 - 2.5x^2 + 12$ would be

```
3  1
2  -2.5
0  12
```

Note that the power will always be a non-negative integer and the coefficient a double.

(g) Overload the stream insertion operator. The polynomial $x^3 - 2.5x^2 + 12$ should appear on the screen *exactly* as shown below:

```
x^3 - 2.5x^2 + 12
```

(h) Implement a member function `double eval (int v);` that evaluates the polynomial for $x =$`v` and returns the result. Try to implement this function so that it avoids a large number of multiplcations or the use of the `pow()` function.

(i) Implement a member function `Polynomial deriv();` that returns the derivate of the current polynomial. Recall that the derivative of a polynomial is the sum of the derivatives of its terms. The derivative of term cx^k is ckx^{k-1}. The derivative of a constant is zero.

(j) Overload `operator+` to allow addition between a polynomial and a constant, regardless of ordering.

Make sure you use the names specified above, otherwise your program will not work with the test driver. A basic test driver will be made available to you. Check the newsgroup for updates.

Follow the commenting guidelines as posted in the PA1 handout.

How to submit your assignment

Email your file to `ido715@ece.northwestern.edu`.