Homework #2

In this assignment you will be using linked lists to represent, display, and evaluate polynomials. The following article provides a good overview of polynomials: http://en.wikipedia.org/wiki/Polynomial.

The following rules should be observed throughout the assignment:

- Each polynomial should be represented as a singly-linked list (use the list implementation covered in the lecture notes).
- Each element in the linked list should represent one of the terms in the polynomial.
- The data held by each element should be type `Double` representing the constant for that term.
- For example, the polynomial $6.0x^3 - 5.3x + 3.1$ would be represented by the linked list `6.0` → `0.0` → `-5.3` → `3.1`.

All code implemented in this assignment should be in a class called `Homework2`. You may use the data structures and algorithm code from the lecture notes.

a) **(1 point)** Implement a method called `appendTerm`:

```
static void appendTerm(SinglyLinkedList<Double> polynomial,
                       Double coefficient)
```

This method should append (insert at the end) the value `coefficient` to `polynomial`. For example, appending `3.1` to polynomial already containing `6.0` → `0.0` → `-5.3` should result in the value `3.1` being added at the end: `6.0` → `0.0` → `-5.3` → `3.1`.

b) **(2 points)** Implement a method called `display`:

```
static void display(SinglyLinkedList<Double> polynomial)
```

This method should print the polynomial in proper polynomial format. For example, displaying polynomial `6.0` → `0.0` → `-5.3` → `3.1` should result in `6.0x^3 - 5.3x + 3.1` being printed.

c) **(2 points)** Implement a method called `evaluate`:

```
static Double evaluate(SinglyLinkedList<Double> polynomial, Double x)
```

This method should evaluate the polynomial for the given value of `x` and return the result. For example, given polynomial `6.0` → `0.0` → `-5.3` → `3.1` and `x` having value `7.0` the function should return `2024.0` (the result of evaluating $6.0*7.0^3 - 5.3*7.0 + 3.1$).

d) **(4 points)** Write a program to test the method from parts a – c. Your test program should demonstrate creating, displaying, and evaluating the following polynomials with the given values for x:

- $x + 1.0$ with $x = 1.0$
- $x^2 - 1.0$ with $x = 2.03$
- $-3.0x^3 + 0.5x^2 - 2.0x$ with $x = 05.0$
- $-0.3125x^4 - 9.915x^2 - 7.75x - 40.0$ with $x = 123.45$

e) **(1 point)** Make sure your source code is well-commented, consistently formatted, uses no magic numbers/values, and follows programming best-practices.

Turn in all source code, program output, diagrams, and answers to questions in a single PDF document.