Gebze Institute of Technology
Department of Computer Engineering

CSE 241
Object Oriented Programming
Fall 2011
Homework # 5
More Classes
Due date Nov 19th 2011

Design a class for a polynomial of arbitrary degree such as
$\mathbf{f(x) = a_n \times x^n + a_{n-1} \times x^{n-1} + \ldots + a_0}$.
Your class definition should include at least the following public member functions

- A no-parameter constructor which forms a polynomial of degree zero with a0 = 0;
- A constructor that accepts the coefficients of arbitrary length;
- Input/output functions
- Overloaded operator[] as setter and getter for the coefficients, if the setter can grow the polynomial if the coefficient index is larger than the polynomial degree
- Overloaded binary operator+, operator-, operator* for polynomial addition, subtraction, and multiplication
- Overloaded uniary operator- for returning a polynomial with the negative of the polynomial coefficients
- A function named **`evaluate`** that evaluates the polynomial for a given X value;
- A predicate function that returns true if the polynomial is a quadratic;
- A member function that returns the maximum number of positive roots (Use ***Descartes' Sign Rule***).
- A static member function that returns the degree of the largest degree polynomial ever constructed.

You may use STL vectors in your class. Test the class with

- const Polynomials;
- Polynomial references;
- Polynomial pointers;
- Polynomial arrays.

Also pass a polynomial objects to test functions using

- Call by value;
- Call by reference;
- Call by simulated reference using pointers.

Notes:

- You should strictly follow the homework submission details and email your homework to the TA.
- Your program should use the OO principles (const modifiers wherever appropriate)
- Use member initializer syntax wherever appropriate.
- Perform error checking wherever appropriate.
- Your program should be well commented and indented.
- Attach a text file showing your test results.
- There will be total of 4 files in your submission. Two C++ files (source and driver) and one header file. Please send also a text file showing your results.