**Assignment 0– Implementation of basic data structures**

1. (Implementation of a doubly linked list) We can represent a polynomial with a form of a doubly linked list using the following structure:

struct Node {

int degree;

int coefficient;

struct Node \*next; // link to the next node. NULL when the last node

struct Node \*prev; // link to the previous node. NULL when the first node

};

The structure ‘Node’ represents a term in a polynomial. Using the ‘Node’ structure, implement the followings:

1. Node \*inputpoly(void): it takes at least a pair of (coefficient, degree) data using keyboard and outputs the corresponding polynomial represented as a doubly linked list with the above Node structure. We suppose only integral numbers are taken. The left is an example of running the inputpoly function. If both degree and coefficient inputs are negative, the function returns the point to the first node of the polynomial. Disregard the final input. Also, take input again if one of the inputs is negative and the other is positive.

Input (degree) (coefficient): 2 2

Input (degree) (coefficient): 1 1

Input (degree) (coefficient): 3 3

Input (degree) (coefficient): -1 -1

Done!!

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Input (degree) (coefficient): 1 1

Input (degree) (coefficient): 3 3

Input (degree) (coefficient): -1 -1

Done!!

1 x + 2 x^2 + 3 x^3

1. void printNode(Node \*inp): it takes the head node of the doubly linked list and print out the representing polynomials. The left figure is the execution example of running printNode(inputpoly());

3. Node \*multiply(Node \*a, Node \*b): This function multiplies the two polynomials ‘a’ and ‘b’ and returns the multiplication result.

\* Your program should use memory efficiently. No memory leaks should occur.

\* Your program should not be crashed for bogus inputs.

\* You need to implement main() function to be used to check your implementation works well.

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| Grading criteria | Percentages |
| Implementation of each functions | 70% |
| Explanation of your implementation with comments | 20% |
| Quality of main() function to demonstrate your implementation is good enough. | 10% |