Assignment 2

Maximum Marks: 50 Time: 3 Hours

(5 Marks: Indentation, 5 Marks: Documentation, 5 Marks: Good coding practice)

August 13, 2022

Question. Given 2 polynomials with integer coefficients, the task is to add and multiply the 2 given polynomials using linked list. The first line of the input is an integer which represents number of variables in the polynomial. Each next line consists of 3 space separated integers representing coefficient, power_var_1(power of variable 1)and power_var_2(power of variable 2) respectively. For example, the following input file represents polynomial $x^6 - 6xy^5 + 5y^6$

————————-input.txt————————-

2 // number of variables – x,y
1 6 0 // coefficient power_var_1 power_var_2
-6 1 5
5 0 6

————————————————————

Read the 2 polynomials from the input file and design functions to add and multiply them. Use the following node structure for representing a polynomial:

```
struct polyNode{
int coeff;
int numVars;
int *varPower;
struct polyNode *link;
};
typedef struct polyNode polyNode;
typedef struct PolyNode * polyNodePtr;
int createPolynomial ( polyNodePtr *head, char * filename);
void printPolynomial ( polyNodePtr head ) ;
int addPlynomials ( polyNodePtr P1, polyNodePtr P2, polyNodePtr *res ) ; //–Time complexity should be O(n)
int multiplyPolynomials ( polyNodePtr P1, polyNodePtr P2, polyNodePtr *res ); //–Time complexity should be O(n^2)
```

Input test case: $2x^5y + 3x^2 + y$ & $3y^5 + 2x + 3$

Output:

Addition: $2x^5y + 3x^2 + 2x + 3y^5 + y + 3$

Multiplication: $4x^6y + 6x^5y^6 + 6x^5y + 9x^2y^5 + 6x^3 + 9x^2 + 2xy + 3y^6 + 3y$

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Input test case: $2x^5y + 3x^2 + y$ & $3y^5 + 2x + 3$

Output:

Addition: $2x^5y + 3x^2 + 2x + 3y^5 + y + 3$

Multiplication: $4x^6y + 6x^5y^6 + 6x^5y + 9x^2y^5 + 6x^3 + 9x^2 + 2xy + 3y^6 + 3y$