

SSN College of Engineering, Kalavakkam
Department of Computer Science and Engineering
III Semester - CSE
UCS 1312 Data Structures Lab Laboratory

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Exercise 2: Polynomial manipulation using Linked List

[CO1, K3]

Create a PolynomialADT with the following fields

Coefficient, Exponent and a pointer to the next node

Polynomial ADT has the implementations for the following operations to

1. Create a polynomial through insertion at the end
`void insertEnd(struct polyADT *p, int coeff, int exp)`
2. Add two polynomials
`polyADT polyAdd(struct polyADT *p1, struct polyADT *p2)`
3. Multiply two polynomials
`struct polyADT* polyMul(struct polyADT *p1, struct polyADT *p2)`
4. Simplifying the polynomial – Combining like terms
`polyADT polySimplify(struct polyADT *p)`
5. Find the degree of polynomial
`void polyDegree(struct polyADT *p)`
6. Evaluate a polynomial
`int polyEvaluate(struct polyADT *p)`

In order to implement Polynomial Manipulation,

- It is necessary to create a file that has polyADT and implementation of above-mentioned functions
- Another file will be created to write the Polynomial manipulation using the polyADT

Add the following validations

During addition, if one of the polynomial is zero polynomial, what will be the result?

During multiplication, if one of the polynomial is zero polynomial, what will be the result?

Test cases

1. Creation
1st Polynomial: $5x^2+4x+2$
2nd Polynomial: $-5x-5$
2. Addition
1st Number: $5x^2+4x+2$
2nd Number: $-5x-5$

Resultant polynomial: $5x^2 - x - 3$

3. Multiplication

1st Polynomial: $5x^2 + 4x + 2$

2nd Polynomial: $-5x - 5$

Resultant polynomial: $-25x^3 - 20x^2 - 10x - 25x^2 - 20x - 10$

4. Simplifying the polynomial

$-25x^3 - 45x^2 - 30x - 10$

5. Degree of polynomial

Input: $25x^3 - 45x^2 - 30x - 10$

Degree - 3

6. Evaluation of polynomial

$-25x^3 - 45x^2 - 30x - 10$

X value is 2

Value is -450