

Computer Science II: Data Structures: Programming Assignment

Alexander Starr – 00567613

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Problem Description

The objective of this assignment is to represent polynomials in the C++ language. To do this, we must implement linked lists, with each node representing a term in the polynomial.

The second portion of the assignment is to add two polynomials together and display the result. The result should be reduced, so that any terms of the same power are combined and not displayed separately.

Also, while not necessary, it is preferable to display the polynomials in descending order.

Finally, the input can be in any preferred way. The program can read from a file, take user input, or only compute hardcoded polynomials.

Source Code and Test Results

Please see `main.cpp` for the source code of my solution.

The program accepts user input for the polynomial addition. It will prompt for a coefficient, then an exponent, and then ask if the user would like to add another term. This continues until the user does not want to add any more terms, and then it repeats for the second polynomial.

The following are examples of input and output of the program:

First Polynomial

Enter a coefficient: 0.75

Enter an exponent: 2

Add another term? [y/n] n

Second Polynomial

Enter a coefficient: 0.1

Enter an exponent: 2

Add another term? [y/n] y

Enter a coefficient: 0.9

Enter an exponent: 1

Add another term? [y/n] n

0.75x²
+ 0.1x² + 0.9x¹

0.85x² + 0.9x¹

First Polynomial

Enter a coefficient: 1

Enter an exponent: 0

Add another term? [y/n] y

Enter a coefficient: 2

Enter an exponent: 1

Add another term? [y/n] y

Enter a coefficient: 3

Enter an exponent: 2

Add another term? [y/n] n

Second Polynomial

Enter a coefficient: 5

Enter an exponent: 5

Add another term? [y/n] y

Enter a coefficient: 4

Enter an exponent: 3

Add another term? [y/n] y

Enter a coefficient: 2

Enter an exponent: 2

Add another term? [y/n] n

```
3x^2 + 2x^1 + 1x^0
+ 5x^5 + 4x^3 + 2x^2
-----
5x^5 + 4x^3 + 5x^2 + 2x^1 + 1x^0
```

First Polynomial

```
Enter a coefficient: 100
Enter an exponent: 100
Add another term? [y/n] y
Enter a coefficient: 1
Enter an exponent: 2
Add another term? [y/n] n
```

Second Polynomial

```
Enter a coefficient: 0.5
Enter an exponent: 100
Add another term? [y/n] y
Enter a coefficient: 0.5
Enter an exponent: 2
Add another term? [y/n] y
Enter a coefficient: 0.5
Enter an exponent: 1
Add another term? [y/n] n
```

```
100x^100 + 1x^2
+ 0.5x^100 + 0.5x^2 + 0.5x^1
-----
100.5x^100 + 1.5x^2 + 0.5x^1
```

Note that the program can handle float coefficients.