

# Polynomials - C++ project

## About the project

This project is a program that processes a polynomial given by the user and returns a result in a proper form depending on a chosen action.

## Used technology

The project was entirely written using C++ language in CodeBlocks 17.12 (with GNU GCC compiler).

Among the technologies that were used were:

- regular expression, used in parser
- classes
- derived methods
- virtual methods
- lists

## How to use

Input data should be given in form like the example:  $x^{12}+13x^7-12$ .

Identical powers do not need to be grouped.

In next step the user is asked to choose from the list:

- add - adds two polynomials
- subtract - subtracts polynomial 1 from polynomial 2
- scalar - performs scalar multiplication of chosen polynomial
- mult - performs multiplication for given polynomials
- m\_find - find result of multiplication by substituting x
- x\_find - find result of chosen polynomial by substituting x
- exit - exits program

After evaluation, the user is asked to choose whether they want to perform another operation on given inputs or exit the program.

## Examples of running application

Menu of actions:

```
Enter the first polynomial:
x^6+2x^4-3x^5+9
Enter the second polynomial:
-2x^6-8x^2+3-9x
What operation do you choose?
list of possible operations:
  add - adds two polynomials
  subtract - subtracts polynomial 1 from polynomial 2
  scalar - performs scalar multiplication of chosen polynomial
  mult - performs multiplication for given polynomials
  m_find - find result of multiplication by substituting x
  x_find - find result of chosen polynomial by substituting x
  exit - exits program
```

After performing an operation:

```
Enter the first polynomial:
x^6+2x^4-3x^5+9
Enter the second polynomial:
-2x^6-8x^2+3-9x
What operation do you choose?
list of possible operations:
  add - adds two polynomials
  subtract - subtracts polynomial 1 from polynomial 2
  scalar - performs scalar multiplication of chosen polynomial
  mult - performs multiplication for given polynomials
  m_find - find result of multiplication by substituting x
  x_find - find result of chosen polynomial by substituting x
  exit - exits program

subtract
3x^6-3x^5+2x^4+8x^2+9x^1+6
Once again? Y/N
```

Another operation on the same examples:

```
add
-1x^6-3x^5+2x^4-8x^2-9x+12
Once again? Y/N
y
.....
What operation do you choose?
list of possible operations:
  add - adds two polynomials
  subtract - subtracts polynomial 1 from polynomial 2
  scalar - performs scalar multiplication of chosen polynomial
  mult - performs multiplication for given polynomials
  m_find - find result of multiplication by substituting x
  x_find - find result of chosen polynomial by substituting x
  exit - exits program

mult
-2x^12+6x^11-4x^10-8x^8+15x^7-4x^6-27x^5+6x^4-72x^2-81x+27
Once again? Y/N
n
.....
Bye bye!
```

## Summary

The most complicated part of whole process was setting a proper regexes to “catch” important pieces of information from input, so they could be used in further operations.