

CS2710: Data Structures and Programming Lab

Assignment-1: Lab-Work

August 8, 2016

1. Implement Abstract Data Type(ADT) **Complex Number** and associated operations on them.

Hint: To represent a complex number ($p + q.i$) where $p, q \in \mathbb{R}$, define a structure with two floating-point fields for real and imaginary parts respectively.

Implement following operations on complex numbers.

- (a) Addition of two Complex Numbers
- (b) Subtraction of two Complex Numbers
- (c) Multiplication of two Complex Numbers
- (d) division of two Complex Numbers
- (e) Modulus/Magnitude/Absolute value of a Complex Number

Note: Write separate functions for each operation. Function corresponding to Modulus operation must return a floating point value precise upto 6 digits after decimal and functions corresponding to rest of the operations must return a Complex Number. Upon execution, your program must present the user with an options-menu with option numbers (starting from 1) for each of the operations and a sentinel-value (-1 or 0) to terminate the program. Your program must prompt the user to enter two complex numbers, one in each line, followed by the choice of operation and repeat this until user decides to terminate the program.

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Addition: 1
Subtraction: 2
Multiplication: 3
Division: 4
Modulus: 5

Input:

0 1
2 3

Output: $2 + 4i$

2. Implement a function to find the Maximum and the Minimum of an array of integers using minimum number of comparisons. You can assume that $1 \leq n \leq 10^5$ where n is the size of the array

Input Description: First line of the input will have a single integer n , the size of the array, followed by n space-separated integers, the array elements, in the second line.

Output Description: Single line containing two space-separated integers, namely, Minimum and the Maximum of the array

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Input:

5

2 1 3 5 8

Output: 1 8