CSE102 Online
Topic: Structure, Pointer
Set: A

Problem 1

A complex number has the form a+bi where a is the real part and b is the imaginary part. Assume that both a and b can be real number values (up to 2 decimal point).

Define a C structure to store complex numbers.

Implement the following functions:

a) **void print(struct complex X):** accepts a complex number X as parameter and outputs the complex number in the form a+bi, a and b are up to two decimal point.
b) **struct complex multiply(struct complex X, struct complex Y):** this function accepts two complex numbers X and Y as parameter and returns their multiplication X*Y as another complex number.
c) **struct complex divide(struct complex X, struct complex Y):** this function accepts two complex numbers X and Y as parameters and returns their division X/Y as another complex number.

Remember that if X=a+bi and Y=c+di then

- X*Y = (ac-bd) + (ad+bc)i and
- X/Y = (X*Yc)/(Y*Yc) where Yc=c-di, the complex conjugate of Y

Input: Four real number values a, b, c, and d representing two complex numbers X and Y

Output: Result of multiplication and division in complex number format.

Write a main function to take user inputs and produce outputs as per the following format.

Input	Output
1 -3 1 2	7.00-1.00i -1.00-1.00i
7 4 -3 -1	-17.00-19.00i -2.50-0.50i

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Problem 2

Implement the following function:

char * prepend(char * s, char * t, int pos)

The function produces a **new** character string (with proper dynamic memory allocation) by prepending all characters starting from position pos of string s to the string t. Assume that pos will always be a valid integer value between 0 and strlen(s). The function should return a pointer to the newly constructed string. All memory addresses should be allocated dynamically for storing the character strings. You must use pointer syntax for all accesses of character strings. You cannot use any library function from string.h except strlen.

Write a main function to take user inputs and produce outputs as per the following format.

Input	Output
Hello world 0	Helloworld
ABCSE BUET 2	CSEBUET
ABCSE BUET 5	BUET