

Department of Computer Science and Engineering
Assignment 1
Subject : Programming and Data Structure (CS19003)

Instructions:

- Give the name of the programs files as <Your roll>.<assignment number>.<question number>.c. For example, 21XX12345_A1_Q1.c for question 1 of assignment 1 of a student with roll 21XX12345. **Follow the file naming convention strictly.**
- Apart from the main .c file for each program, you should also upload one additional temporary .c file for each program (such as when you have finished half of the code). The naming for the temporary file should be in the format <Your roll>.<assignment number>.<question number>_temp.c. For example, 21XX12345_A1_Q1_temp.c **Make sure that your main code do not deviate much from its temporary code for each program.**
- You should upload the main .c file and the temporary .c file individually to the Moodle course web page once you finish answering each question. No need to zip the files.
- The **deadline** to upload the programs is 12:00PM. Beyond that, submission will be closed (No extensions will be granted).

Answer all the questions.

[20 x 5 = 100 Marks]

1. Write a C program to print on the screen the following lines in the exact same sequence as given. You cannot use more than TWO printf() to print everything on your screen.

“I am learning C Programming. I am very excited.
This is my first time.”

[20]

2. The office in which you are working has decided to contribute a part of your salary towards a special fund contribution. Your contribution is calculated as the addition of 10% of your basic pay and 5% of your Dearness Allowance (DA). Write a program to take input two integers as your basic pay and as your DA and display the fund contribution.

Example:

Input: Basic Pay: 1000

DA : 200

Output: Fund contribution: 110 (10% of 1000 + 5% of 200)

[20]

3. Complex numbers are represented geometrically as a point in a 2D Argand plane, where the x-axis denotes the real part and the y-axis denotes the imaginary part. Take input one complex number from the keyboard. Hence *reflect* this complex number in the Argand plane with respect to the vertical y-axis.

- (a) Display the reflected complex number in the form “a + ib” (i.e if the real part is 2 and the imaginary part is -5 then you should display “2-i5” on the screen).
- (b) Additionally, display the area enclosed by the rectangle between the horizontal x-axis (the real axis) and the straight horizontal line connecting the two complex numbers, i.e the original and the reflected complex number. The other two sides of the rectangle are the vertical height of the imaginary part of the two complex numbers.

[Hint: For input, maintain two separate variables, one denoting the real and the other imaginary part for one complex number. You can assume all integer variables.] **[20]**

4. Given the base radius and total surface area (curved surface area + top circular area + bottom circular area) of an enclosed right circular cylinder in cm, first calculate the height of the cylinder (in cm) and then find its volume (in cm^3). Hence, calculate the cost of storing a perfume to fill exactly $(2/3)^{\text{rd}}$ of the cylinder at an amount of Rs.10 per cubic centimeter and the remaining volume is filled with Nitrogen gas at Rs.2 per cubic centimeter. Your input should be the radius and surface area of the cylinder (in cm and cm^2 respectively) and you should display the height, volume and the cost of storing the perfume with the Nitrogen gas.

Assume,

$$\pi = 3.141$$

$$\text{Curved surface area of cylinder} = 2 * \pi * \text{base radius} * \text{height}$$

$$\text{Volume} = \pi * \text{radius}^2 * \text{height}$$

5. If a five-digit number is taken as input through the keyboard, write a C program to print the difference of the sum of the last three digits **from** the sum of the first two digits of the number. Also use **one** single integer variable to generate the reverse of the last three digits and print that single integer [**Hint:** Use positional notation for decimal numbers to generate the reverse number.].

Example:

Input:

97321

Output:

Difference = 10 (sum of (9,7) - sum of (3,2,1))

Reverse number = 123 (as a single integer)

[20]