

**Shiv Nadar Institution of Eminence, Delhi, NCR**

**Lab sheet for CSD101 (Introduction to computing and Programming)**

**Semester of Implementation: Monsoon, 2024**

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**Instructions:**

1. Once you complete the assignment, please show it to the TA.
2. Students must come to the lab and must show the assignments in the designated lab hours. Day-to-day lab performances will be recorded and will carry 15% weightage in internal assessment.
3. Lab will start in exact time. Students should enter the lab and take a seat 5 minutes before.
4. It is recommended to use LINUX platform for execution of the program.
5. Batch change to show the assignments WILL NOT be allowed.
6. Malpractice (in ANY form) will attract heavy penalties.
7. A useful link: <https://www.w3schools.com/c/index.php>

**Lab Assignment 7**

**Deadline: 13-10-2024 (11:55 PM) for Monday batch**

**15-10-2024 (11:55 PM) for Wednesday batch**

**16-10-2024 (11:55 PM) for Thursday batch**

**17-10-2024 (11:55 PM) for Friday batch**

**Total Marks: 100**

**Objective:** Programs based on Functions

**Steps to run C program**

### Step 1: gedit filename.c

### Step 2: Compiling using GCC compiler

We use the following command in the terminal for compiling our filename.c source file

```
$ gcc filename.c -o filename
```

### Step 3: Executing the program

After compilation executable is generated and we run the generated executable using the below command.

```
$ ./filename
```

**Q1.** Previously you computed BMI for all the student's using arrays. Now, you should make use of a function to do that. To this end, write a program which takes as input the number of students  $n$  in the class [assume that  $n \leq 100$ ]. Input the "height" (in meters) and "weight" (in kilograms) of each student in two different arrays. You should compute each student's BMI and store it in a third array named "bmi".

[a] For this computation create a function which takes the arrays of weight, height, and bmi as an input and stores the BMI-values in the last array, *compute\_bmi*(int n, float \*weight, float \*height, float \*bmi). The formula of BMI is as follows =  $\left(\frac{weight}{height^2}\right)$ . To validate your function print one of the values from the "bmi" array.

### Input

Enter the number of students in class: 4 //Input

Enter details for student 1 //Input

Weight: 35 //Input

Height: 1.45 //Input

Enter details for student 2 //Input

Weight: 70 //Input

Height: 2 //Input

Enter details for student 3 //Input

Weight: 90 //Input

Height: 2 //Input

Enter details for student 4 //Input

Weight: 79 //Input

Height: 1.8 //Input

## Output

Printing BMI-value of student 3 – 22.5

**[b]** Extend the above program so that it can prints the details (of weight, height, BMI-value, and BMI-categorization) for a particular student using a function ***print\_bmi\_details***(int std\_id, float \*weight, float \*height, float \*bmi\_val)

Use the following table for categorization.

Category	BMI range - kg/m2
Mild Thinness	17 - 18.5
Normal	18.5 - 25
Overweight	> 25

If none of the condition matched, then print “Inhuman Status”.

## Input

You would like to see the details for which student: 2

## Output

Weight: 70      Height: 2      BMI-value: 17.5      BMI-category: Mild Thinness

**Q2.** Festive season will be starting soon this year. You would like to print some nice festive patterns on your gift wraps. Write a program which prints the below decorative pattern using a function ***print\_decoration***(int n). The function takes the level of pattern 'n' as an input and prints the corresponding decorative pattern?

### Input and Output

n = 1	n = 2	n = 3	n = 4
*	*	*	*
	*~*	*~*	*~*
		*~*~*	*~*~*
			*~*~*~*

### Complementary Assignment for self-practice

**Q3.** Can you think of some other decorative patterns similar to question 2 which can grow given a single parameter 'n' or multiple parameters 'n,m,...etc'. Create your own decorative pattern and share it with us. Be as creative as possible.

**Q5.** Write a program which can compute the volume of a cube (length), sphere (radius), cuboid (length, breadth, and height), and cone (height and radius) given the input parameters using functions. Take a given volume of building material, say clay, as an input and calculate how many of individual geometric items (cube/sphere/cuboid/cone) can be constructed using it. Assume the unit of length, breadth, height, radius, and volume is same.

**Q4.** Write a program to print prime numbers between a given range using functions.

**Submission Format:-** You have to upload: (1) The source code in the following format in a zipped folder: Assgn7\_RollNo.zip. Inside the zipped folder save each program with Assgn6\_task#\_RollNo.c

**Note:** Please follow this naming convention mentioned above.

**Grading Policy:-** The policy for grading this assignment will be - (1) show to TA 66 marks  
(2) Code submission with indentation: 34 marks.

**- All submissions are subject to plagiarism checks. Any case of plagiarism will be dealt with severely.**