**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 4**

**Deadline:  15-09-2024 (11:55 PM) for Monday batch**

**17-09-2024 (11:55 PM) for Wednesday batch**

**18-09-2024 (11:55 PM) for Thursday batch**

**19-09-2024 (11:55 PM) for Friday batch**

**Total Marks: 100**

**Objective:** Programs based on Decision Control Statements and Loops.

**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. Take the height of the user (in meters) and the weight of the user (in kilograms) as the input and calculate their BMI ($\frac{weight}{height^2}$). Also, display which category they belong to based on the BMI.

Use the following table.

| Category | BMI range - kg/m2 |
|---|---|
| Mild Thinness | 17 - 18.49 |
| Normal | 18.5 – 24.99 |
| Overweight | > 25 |

If none of the condition matched, then print inhuman status.

**Input:**

Enter the Weight in kg:     35

Enter the height in meter:    1.25

**Output:**

Mild Thinness

Q2. You want to have fun during the weekend. But you should also finish assignments, and it can also rain during the weekend. Write a program to determine what you would be doing during the weekend based on the following conditions,

- Assignments Not done → Study
- Assignments done and Rain → Watch a movie
- Assignments done and No rain → Hangout with friends

[a] Solve the above using If-else (or If-else ladder) statements.
[b] Solve the above using Switch-case statements.
**Hint**: for [b] it would be easier if you store each of the condition in a 'int' variable and use their sum as a 'case' condition.

**Input:**
Assignment Done – 1
Raining – 0

**Output:**
Hangout with friends

Q3. Write a C program that calculates the average score of a student based on three subjects and determines their grade. The grading system is as follows:

- A: Average score >= 85
- B: Average score >= 75 and < 85
- C: Average score >= 65 and < 75
- D: Average score >=50 and <65
- E: Average score >=30 and < 50
- F: Average score<30

**Constraint:** Your C program should not get a negative score. If the user gives a negative score, then it should print **"invalid score".**

[a] Solve the above using nested If-else statements.
[b] Solve the above using Switch-case statements.

**Input:**
Enter Average Score: 70

**Output:**
Your grade is C

Q4. Robin is 700 m far from Dining Hall - 1 (DH-1) and 900 m far from Dining Hall - 2 (DH-2). He wants to have a quick bite before the next class. But his decision to go to DH-1 or DH-2 is also dependent on the lunch-menu. Otherwise, he will go to the café near the D-block. Help Robin decide where he should have his food if he walks at a speed of 5km/hr and the time taken by him to reach either of the dining hall is $t$,

- Go to DH-2 if there's a sweet in the menu and $t < 10$ min
- Otherwise, go to DH-1 if there's a sweet in the menu and $t < 10$ min
- Otherwise, go to DH-1 if $t < 8$ min
- Otherwise, go the nearby café

| Lunch Menu | DH -1 | DH -2 |
|---|---|---|
| Monday | sweet, rice/chapati, daal, paneer | lassi, rice/chapati, gravy, chicken |
| Tuesday | rice/chapati, daal, allo-gobi, aam panna | rice/chapati, daal, allo-beans, curd |

Write a program which outputs as to where Robin goes for lunch on Monday and Tuesday.

[a] Solve the above using If-else ladder statements.
[b] Solve the above using Switch-case statements.
[c] Write a comparative analysis between [a] and [b] justifying which approach you would choose for this case. Also try changing the lunch Menu and Robin's walking speed and observe differences if any.

**Input:**
The above conditions as different variables


**Output:**

For Monday's lunch Robin goes to DH-1

For Tuesday's lunch Robin goes to Nearby Café

**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.**