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 5

Deadline: 23-09-2024 (11:55 PM) for Monday batch

25-09-2024 (11:55 PM) for Wednesday batch

26-09-2024 (11:55 PM) for Thursday batch

27-09-2024 (11:55 PM) for Friday batch

Total Marks: 100

Objective: Programs based on For, While, and Do-while 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. Previously you wrote a program which can compute your BMI. Now, you are supposed to compute the BMI for the whole class. For this, write a program which takes as input the number of students in the class and then computes the BMI for each student based on their height and weight. Each student enters their height (in meters) and their weight (in kilograms) as input and the program outputs their BMI and the associated BMI-category, wherein BMI = $(\frac{weight}{height^2})$.

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 and Output

```
Enter the number of students in class: 3                    //Input


Enter details for student 1                                  //Input

Weight: 35                                                    //Input

Height: 1.45                                                  //Input
```

```
BMI-value: 16.6     BMI-category: Inhuman Status     //Output


Enter details for student 2                          //Input
Weight: 70                                           //Input
Height: 2                                            //Input
BMI-value: 17.5     BMI-category: Mild Thinness  //Output


Enter details for student 3                            //Input
Weight: 90                                             //Input
Height: 2                                              //Input
BMI-value: 22.5     BMI-category: Normal              //Output
```

Q2. At your fresher party your seniors want to form different teams for the team-based fun events. The team formation is based on the *sum* of the digits of your student-ID. You would be divided into following teams based on the below conditions,

- Team A: Sum is divisible by 3
- Team B: Sum is divisible by 5
- Team C: Sum is divisible by 7
- Team D: None of the above, default team

Write a program that takes your student-ID as an input finds the sum of its digits and then outputs your team's name.

Input

Enter your student-ID: 70252

Output

You belong to Team D

Q3. While moving into the university hostel you came with a lot of boxes from your home. Your parents carefully placed your favourite book in one of the boxes and as usual you don't have a clue about it. Now, you must move these boxes to your room, also you want to find your favourite book.

[a] You know that you have *n* number of boxes in total, enter this as an input. As you move *i*-th box print “Moving box *i* ”. Each box contains three items, check if one of those items is your favourite book. If you do find the book within a box print “Yay I found the book” and do not check for the book anymore. Please note that even after you have found the book you still need to keep traversing through all the items and all the boxes. Write a program to do the above with the following input and output,

Input

```
Enter the number of boxes: 5
```

Input and Output

```
Moving box 1: Item-1 IsBook-0, Item-2 IsBook-0, Item-3 IsBook-0
Moving box 2: Item-1 IsBook-0, Item-2 IsBook-0, Item-3 IsBook-0
Moving box 3: Item-1 IsBook-0, Item-2 IsBook-1 Yay I found the book, Item-3
Moving box 4: Item-1, Item-2, Item-3
Moving box 5: Item-1, Item-2, Item-3
```

[b] Maybe you are too careless, and you don’t even know the total number of boxes. In this case after moving each box check if there are more boxes remaining. Keep moving the boxes until all of them are moved. Write a program to do the above with the following input and output,

Input and Output

```
Moving box 1: Item-1 IsBook-0, Item-2 IsBook-0, Item-3 IsBook-0
Are all boxes moved: 0

Moving box 2: Item-1 IsBook-0, Item-2 IsBook-0, Item-3 IsBook-0
Are all boxes moved: 0

Moving box 3: Item-1 IsBook-0, Item-2 IsBook-0, Item-3 IsBook-0
Are all boxes moved: 0

Moving box 4: Item-1 IsBook-0, Item-2 IsBook-1 Yay I found the book, Item-3
Are all boxes moved: 0

Moving box 5: Item-1, Item-2, Item-3
Are all boxes moved: 0

Moving box 6: Item-1, Item-2, Item-3
Are all boxes moved: 1
```

Finally, I am done!!!

Complementary Assignment for self-practice

Q4. Write a program which checks if a three-digit number is either [i] a palindrome number, [ii] an armstrong number, [iii] a perfect number, [iv] a prime number, or [v] none of these, just an ordinary number!!!.

Input

Enter a three-digit number: 153

Output

It is an Armstrong number

Submission Format:- You have to upload: (1) The source code in the following format in a zipped folder: Assgn5_RollNo.zip. Inside the zipped folder save each program with Assgn5_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.