
PROGRAMMING FUNDAMENTALS
LAB 04: DECISION CONTROL STRUCTURES

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READ IT FIRST

Prior to start solving the problems in this assignments, please give full concentration on following points.

1. DON'T CHEAT – You will learn NOTHING if you do it.
2. DEADLINE – Wednesday September 25, 2019.
3. SUBMISSION – This assignment needs to be submitted in a *soft copy*.
4. WHERE TO SUBMIT – Please visit your Google Classroom.
5. HOW TO SUBMIT – rename all `.cpp` file as `prob0x.c` where `x` is the question number. And, then zip them all. Rename the zipped file with your Student ID. The zipped file should contain total files, each with the name of question number. You have to submit the zipped file.

YOUR MIND IS PROGRAMMABLE – AND IF YOU'RE NOT PROGRAMMING
IT THEN SOMEONE ELSE WILL PROGRAM IT FOR YOU. JEREMY HAMMOND.

1 GET...SET...GO!

Keep it with you!

- Indent your code inside the `main()` function. It's a good practice!
- It looks good if you keep your code indented inside the `if` and `else` blocks as well.
- Don't underestimate the power of simple brackets '(' and ')'.
- Comment your code, where it is necessary.
- Read the entire question. Don't jump to the formula directly.

PRACTICE TASK 01:

Write a program to ask input *grade* from user and output grade according to following criteria:

Marks Range	Grade
90 – 100 Marks	A1 Grade
80 – 90 Marks	A Grade
70 – 80 Marks	B Grade
60 – 70 Marks	C Grade
Less than 60 Marks	F Grade
If marks are not in range(0-100)	Invalid Marks

SOLUTION:

```
#include <iostream>
using namespace std ;
int main ()
{
    int grade;

    cout<<"Enter marks of student: ";
    cin>>grade;

    if (grade >= 90 && grade <= 100)
    {
        cout<<"A1 Grade";
    }
    else if (grade >= 80)
    {
        cout<<"A Grade";
    }
    else if (grade >= 70)
    {
        cout<<"B Grade";
    }
    else if (grade >= 60)
    {
        cout<<"C Grade";
    }
    else if (grade >= 0 && grade < 60)
    {
        cout<<"F Grade";
    }
    else
    {
        cout<<"Invalid Marks";
    }
    cout<<endl;          // for new line

    system ("PAUSE") ;
```

```

    return 0 ;
}

```

Note: After performing above task, Do some changes and check output, for example: change all else if and else to if statement and observe the behaviour of code. Play With Code.

Exercise Tasks

The questions are below:

1. Write a program in C++ language that asks user to enter two numbers, a and b ; and tells the user whether a is divisible by b or not?
2. Write a program in C++ language that asks user to enter a character, x ; and verifies whether it's a number, vowel or a consonant? You know it very well, a character in computer science holds an entity but not more than one alphabet, or number or special symbol.
3. A number can be an even or can be odd. It is either positive or negative. Or in all other case it can be nothing, but a ZERO. Well, what if we combine them all. Write a program that asks user to enter a *number*. Your program, then, tells that the *number* entered is one of these: positive even, positive odd, negative even, negative odd or it's nothing but a ZERO.
4. At Icon by Ghouri's Store, on purchasing above a certain amount, the customer gets a discount of 10% on total bill. It is meant when the amount of all purchased items is more than Rs. 5,000. If quantity and price per item are input through the keyboard, then decide whether the customer is able to get discount or not?
5. In K-Electric the gross salary of an employee is calculated as: (a) If the basic salary of an employee is below Rs. 15,000; then Rental Allowance = 30% of basic salary and Dining Allowance = 15% of basic salary. (b) If his salary is in between Rs. 15,000–20,000 then Rental Allowance = Rs. 6,000 and Dining Allowance = 20% of basic salary. Write a program such that, if the employee's basic salary is input through the keyboard write a program to find his Gross Salary.

$$\text{GrossSalary} = \text{BasicSalary} + \text{RentalAllowance} + \text{DiningAllowance}$$

6. If *cost price* and *selling price* of an item is input through the keyboard, write a program to that tells seller is at profit or loss? Further, it should ask user to enter 'C' if he or she wants to know how much *profit* or *loss* seller incurred.
7. If the ages of *Mubashir*, *Parkash* and *Sooraj* are taken as input from user, write a program that tell who is the *youngest* of them.
8. Cabinets and Boxes are objects that are mostly in cubic shape. Make a program that takes inputs like *height*, *width* and *depth* from user and then calculate *volume* of the cube:

$$\text{volume} = \text{height} * \text{width} * \text{depth}$$

After calculating *volume* of cube, compare it with following ranges and print the relevant label:

Volume Range	Label
1 cm ³ – 10 cm ³	Extra Small
11 cm ³ – 25 cm ³	Small
26 cm ³ – 75 cm ³	Medium
76 cm ³ – 100 cm ³	Large
101 cm ³ – 250 cm ³	Extra Large
251 cm ³ and above	Extra-Extra Large

9. TEAM NASCENT INNOVATIONS is a software house that insures the software developers working with them in the following cases:
- If the software developer is married.
 - If the software developer is unmarried, male and above 28 years of age.
 - If the software developer is unmarried, female and above 22 years of age.

In all other cases, the software developer is not insured. If *marital status*, *gender* and *age* of the software developer are user-defined, write a program to determine whether the software developer is to be insured or not.

10. Suppose you are an information officer in the admission department at SUKKUR IBA UNIVERSITY. Numbers of people come to you with several questions regarding admission. Officers in the admission department came up with a certain criteria as follows:
- For admission in Department of Computer Science 50% score required in student's high school examination but student must has background of engineering.
 - For admission in Department of Software Engineering 55% score required in high school and background should be of engineering or medical.
 - For Business Management minimum 45% score is required no previous background is essential.

Write a program to take input high school's *score*, *major* (E for pre-eng, M for pre-medical) and output for which program(s), student is eligible to apply.

11. PAKISTAN ARMY has very tough criteria for recruitment. It requires an applicant to be fit on the following set of criteria. All are must. You may consider the value of Nationality as a character input.

Criterion	Accepted Value
Nationality	P or K
Age	18-22
Education	minimum 12 years

12. SINDHRI is a famous restaurant in SUKKUR, they have almost manual process. Now they are willing to use computers and need a computer program that helps them to process their orders. They defined their process as: When a user comes and ask about deals, we replied we have three deals for three kind of budget limits and our deals are associated with days. Often we have complementary food to our customers. You have to write a computer program using C++ language that asks user to enter the *day* as input, then it asks how much *money* you have, if it is right day and money is suitable for deal then algorithm suggest it otherwise says "Sorry! you cannot have any deal in this range, you can buy single items". They showed following menu that bears information.

Day	Price (Rs)	Menu Details
Monday	15.00 – 50.00	Deal 01
	51.00 – 100.00	Deal 01 and Deal 02
	101.00 and more	Deal 01, Deal 02, Deal 03 + complementary sweets
Tuesday & Wednesday	15.00 – 50.00	Deal 01
	51.00 – 100.00	Deal 01 and Deal 04
	101.00 and more	Deal 01, Deal 04, Deal 05 + complementary shake
Thursday & Friday	15.00 – 50.00	Deal 01
	51.00 – 100.00	Deal 01 and Deal 06
	101.00 and more	Deal 01, Deal 06, Deal 07 + complementary Falooda
Weekends	15.00 – 50.00	Deal 01 + complementary soup
	150 / person	Buffet