CHAPTER-3 - Conditional Instruction

Some times we want to watch Comedy videos on youtube if the day is Sunday
Sometimes we Order junkfood if its our friends birthday in hostel
you might want to bought an umbrella if its raining and you have money
you Order the meal if dal or your favourite bhindi is listed On the menu

All these are decisions which depends On a Condition being met
In C language too we must be able to Execute instructions On a Conditions being met.

Decision Making in C

If - Else Statement
Switch Statement

If - Else Statement

The Syantax of an If - Else Statement in C looks like

```
if (Condition to be checked) {
        Statements - if - condition - true ;
}
```

Else {
    Statements - if - condition - false;
}

Code Example

```
int a = 23;

if (a > 18){
    print("you can drive\n");
}
```

(*) Note that else block is not necessary but Optional

Relational Operators in C

Relational Operators are used to Evaluate conditions (true or false) inside the if statements Some examples of relational Operators are:-

==, >=, >, <, <=, !=

== : Equals
>= : greater than or Equals to
!= : not Equal to

Important Note:- '=' is used for assignment where as '==' is used for Equality Check.

The condition can be any Valid Expression In C a non zero value is considered to be true.

Logical Operators

&&, || and ! are three logical operators in C these are read as "AND", "OR" and "NOT" They are used to provide logic to our C programs.

Usage of logical operators:-

(i) && → AND → is true when both the conditions are true
"1 and 0" is evaluated as false
"0 and 0" is evaluated as false
"1 and 1" is evaluated as true

(ii) || → OR → is true when at least one of the conditions is true (1 or 0 → 1) (0 or 1 → 1)

(iii) ! → returns true if given false and false if given true
!(3==3) → Evaluates to false
!(3>30) → Evaluates to true

As the number of conditions increases the level of indentation increases. This reduces readability Logical Operators come to rescue in such cases.

Else if Clause

Instead of using multiple if statements we can also use "else if" along with if thus forming an if-(else-if)-else ladder.

```
if {
  // statements;
  }
else if {---}
else {---
  }
```

Using if-else if-else reduces indents
The last "else" is optional
Also there can be any number of "else if"

Last else is executed only if all conditions fail

Operator precedence

priority	Operator
1st	!
2nd	*, /, %
3rd	+, -
4th	<>, <=, >=
5th	==, !=
6th	&&
7th	||
8th	=

Conditional Operators

A short hand "if - else" can be written using the conditional or ternary operators

Condition ? Expression - if - true ; Expression - if - false

Ternary Operators

Switch Case Control Instruction

Switch - Case is used when we have to make a choice between number of alternatives for a given variable

```
Switch ( Integer - Expression )
  {
  Case C1:          C1, C2 & C3 → Constants
     code;          code ;
  Case C2:                  Any valid C
     code;                     code
  Case C3:
     code;

  default:
     code;
  }
```

The value of Integer - Expression is matched against $C_1, C_2, C_3 \ldots$ If it matches any of these cases that case along with all subsequent "case" and "default"

Statements are Executed

Q⇒ Quick Quiz :- write a program to find grade of a student given his marks based on below:

→ 90 - 100 → A → < 70 → F
80 - 90 → B
970 - 80 → C
60 - 70 → D

⇒
```
#include <stdio.h>
int main () {
int marks;
printf("Enter the marks of the Student")
Scanf("%d", &marks)

if ( 90 ≤ marks < 100 ) {
    printf("The Student has Secured A Grade");
}
Else if ( 80 ≤ marks < 90 ) {
    printf("The Student has Secured B Grade");
}
Else if (70 ≤ marks < 80) {
    printf("The Student has Secured C Grade");
}
Else if (60 ≤ marks < 70) {
    printf("The Student has Secured D Grade");
}
Else if ( marks < 60 ) {
    printf("The Student has Secured F Grade
                and Failed this test");
}
```

```
Else ("Enter the marks correctly");
    return 0;
}
```

Important Notes

(1) We can use Switch Case Statement Even by writing cases in any Order of Our choice (not necessarily ascending)

(2) char values are allowed as they can be easily Evaluated to an integer

(3) A Switch can occur within another but in practice this is rarely done.

CHAPTER-3 (Practice Set)

Q1) What will be the Output of this program

```
int a=10
if (a=11)
    printf("I am 11");
else
    printf("I am not 11");
```

⇒ The Output will be

(*) → I am 11

a=11 is an assignment so it sets x to 11

Hence if Statement prints

I am 11

Q23 Write a program to find out whether a student is pass or fail if it requires total 40% and at least 33% in each subject to pass Assume 3 subjects and take marks as an input from the user.

⇒

```
#include <stdio.h>

int main (){
    int physics;
printf("Enter the marks in physics");
  Scanf("%d", &physics);

  int chemistry;
printf("Enter the marks in chemistry");
  Scanf("%d", &chemistry);

  int Maths;
printf("Enter the marks in Maths");
  Scanf("%d", &Maths);

if (physics <33 || chemistry <33 || Maths <33){
    if (physics <33){
      printf("you are fail in physics\n");
    }
  if (chemistry <33){
    printf("You fail in chemistry\n");
    }
  if (the Maths <33) {
    printf("you are fail in Maths\n");
    }
}
```

```
Else if ((physics + chemistry + Maths)/3 <= 40){
    printf ("you are fail\n")
}
else{
    printf ("you are pass\n");
}
return 0;
}
```

Q3) Calculate income tax paid by an Employee to the government as per the slabs mentioned below

Income slabs	Tax
2.5 - 5.0L	5%
5.0 - 10.0L	20%
Above 10.0L	30%

```
#include <stdio.h>
int main()
{
    int Income, tax;
    printf("Enter your Income\n");
    scanf("%d", &Income);

if (Income < 250000)
    printf("No income tax for you go Enjoy
                your life\n");
Else if (Income >= 250000 && Income < 500000){
        tax = Income * 0.05;
printf("you have to pay 5 percent
                tax which is %d\n", tax);
}
```

```
Else if (Income >= 500000 && Income < 1000000){
        tax = Income * 0.20;
    printf("You have to pay 20 percent tax :%d\n",
                                        tax);
Else if (Income >= 1000000){
        tax = Income * 0.30;
    printf("You have to pay 30 percent tax :%d\n",
                                        tax);
    }
Else
    printf("Invalid input\n");
    return 0;
}
```

(Q13) write a program to find whether a year Entered by the User is a leap year or not take year as an input from the user?

```
#Include <stdio.h>
int main(){
    int year;
printf("Enter the year you want to
                                check");
Scanf("%d", &year);

if ((year %4==0 && year%100 !=0) ||
                        (year %400==0
    printf("%d is a leap year\n", year); }
Else{
    printf("%d is not a leap year\n", year);
}
```

return 0;
}

Q5» write a program to determine whether a character Entered by the user is lowercase or not.

```
#include <stdio.h>
int main(){
    char a;
    printf("Enter a character: ");
    scanf("%c", &a);

    if (a>=65 && a<=90){
        printf("Uppercase letter\n");
    }
    Else if (a>=97 && a<=122){
        printf("Lowercase letter\n");
    }
    Else if (a>=48 && a<=57){
        printf("Digit\n"); }
    Else {
        printf("Special character\n"); }
    return 0;
}
```

Q6» Write a program to find greatest of four number Entered by the User?

2)

```
#include <stdio.h>
int main(){
    int a, b, c, d;
    printf("Enter the value of a\n");
    scanf("%d", &a);
    printf("Enter the value of b\n");
    scanf("%d", &b);

    printf("Enter the value of c\n");
    scanf("%d", &c);
    printf("Enter the value of d\n");
    scanf("%d", &d);

if (a>b && a>c && a>d) {
  printf("a is the greatest number"); }
else if (b>a && b>c && b>d){
  printf("b is the greatest number"); }
else if (c>a && c>b && c>d){
  printf("c is the greatest number"); }
else{
  printf("d is the greatest number\n"); }

return 0; }.
```