
Conditional (Selection) Statement:-

C++ provides four types of selection structures:-

- 1) if statement.
- 2) if.....else statements.
- 3) Nested if statements.
- 4) Switch statement.

1- If statement :-

The if selection structure is a single-selection structure, it selects or ignores a single action, the if statement has the following form:-

if (expression (condition)) statement;

First *expression* is evaluated. If the outcome is nonzero then *statement* is executed. Otherwise, nothing happens.

Example (1):-

```
#include<iostream.h>

int main () {
    int n, d;
    cin >> n >> d;
    if (n%d==0) cout << n << " is divisible by" << d << endl;
    return 0 }
```

Example (2) : w.p. to read two integers compare between then if they are equal or not using if statement?

Solution:-

```
#include <iostream.h>

int main ( ) {
    int num1, num2;
    cout << "Enter two integers" << "\n";
    cin >> num1 >> num2;
    if (num1==num2) cout << num1 << "is equal to " << num2 << endl;
    if (num1!=num2) cout << num1 << " is not equal to" << num2 << endl;
    return 0;

}
```

2- if.....else statements:-

the if/else selection structure is a double-selection structure , it selects between two different actions:-

**if (condition) statement 1;
else statment 2;
or
if (condition1) statement 1;
else if (condition 2) statement 2;
else statement 3;**

Example (1) :- W.P to read any number n whatever, then print wether n is an even or is odd number using if/else structure?

Solution:-

```
# include <iostream.h>
int main ( ) {
int n;
cout << "Enter any number"<<"\n";
cin>> n;
if (n%2==0);
cout<<" the number is even"<<"\n";
else
cout <<" the number is odd"<<"\n"
return 0; }
```

Example (2):- W.P to read two numbers(x=6 &y=2) , then find the maximum number using if/else structure?

Solution:-

```
#include <iostream.h>
int main() {
int x = 6;
int y = 2;
if(x > y)
cout << "x is greater than y"<<"\n";
```

```
else if(y > x)
cout << "y is greater than x"<<"\n";
else
cout << "x and y are equal"<<"\n";
return 0; }
```

3- Nested if statements

This type of nested if statement can be written as follows:-

if (condition 1)

if (condition 2)

if (condition n)

statement;

or if(condition 1 && condition 2 && condition n)

statement;

Example(1): w.p. to find the maximum number from three numbers using if statement?

```
#include <iostream.h>
int main ( ) {
int a, b, c;
cout<<" Enter three integers:"<<endl;
cin>> a >> b>> c;
if (a>= b)
if (a>= c)
cout<< "a"<< a<< endl;
if (b>= a)
if (b>= c)
cout<< "b"<< b << endl;
if (c >= a)
if (c>= b)
cout<< "c"<< c<< endl;
return 0;}
```

Example(2): w.p. to test if an enter integer number is even or odd and positive or negative.

Solution:-

```
#include <iostream.h>

int main ( )
{
    int x;
    cout <<"input any integer"<<endl;
    cin >>x;    // enter x= -2, then 7.
    if (x>=0 && x%2==0)cout <<"The number is even and positive"<<endl;
    if (x<0 && x%2==0)cout <<"The number is even and negative"<<endl;
    if (x<0 && x%2!=0) cout <<"The number is odd and negative"<<endl;
    if (x>0 && x%2!=0) cout <<"The number is odd and positive"<<endl;
    return 0;
}
```

4-Switch statement

The *switch-case* is another conditional structure that may or may not execute certain statements. The switch statement provides a way of choosing between a set of alternatives, based on the value of an expression. The general form of the switch statement is:-

switch (expression)

```
{
    Case constant 1:Statement1;break;
    Case constant 2:Statement2;break;
    Case constant n:Statementn;break;
    Default:Statement list;
}
```

The **switch statement** evaluates the value of an expression and branches to one of the case labels. Duplicate labels are not allowed, so only one case will be selected. The expression must evaluate to a integer, character, or enumeration. case labels can be in any order and must be constants. The default label can be put anywhere in the switch. A break statement inside a switch tells the computer to continue the execution after the switch. If the break is not there, execution continues with the next statement.

Example (1) : Design the simple calculator program using (switch).

Solution

```
#include <iostream.h>

int main ( ) {
    char x;
```

```
int operand1,operand2;
cout<<"Input an arithmetic operator"<<endl;
cin>>x;
cout <<"Input two integer"<<endl;
cin>>operand1>>operand2;
switch (x){
case'+': cout <<"The result is"<<operand1+operand2<<endl;
break;
case'-': cout <<"The result is"<<operand1-operand2<<endl;
break;
case'*': cout <<"The result is"<<operand1*operand2<<endl;
break;
case'/': cout <<"The result is"<<operand1/operand2<<endl;
break;
case'%': cout <<"The result is"<<operand1%operand2<<endl;
break;
default:cout << "unknown character:" << x << endl;}
return 0;}
```

It should be obvious that any switch statement can also be written as multiple if-else statements. The above example may be written as:

Example(2) : Design the simple calculator program using (else if).

Solution.-

```
#include <iostream.h>
int main ( ){
char x;
int operand1,operand2 ;
cout<<"Input the Arithmetic operator"<<endl;
cin>>x;
cout <<"Input two integer"<<endl;
cin>>operand1>>operand2;
if (x == '+')
cout <<"The result is"<<operand1+operand2<<endl;
```

```
else if (x == '-')
cout <<"The result is"<<operand1-operand2<<endl;
else if (x == '*')
cout <<"The result is"<<operand1*operand2<<endl;
else if (x == '/')
cout <<"The result is"<<operand1/operand2<<endl;
else if (x == '%')
cout <<"The result is"<<operand1%operand2<<endl;
else
cout << "unknown character:" << x << endl;
return 0;}
```

Example (3) :- W.P to part the entered 4 digits number into its digits?

Solution:-

```
#include <iostream.h>
int main ( ) {
int a, k, b;
cout<<" Enter the number as 4 digits=";
cin>>a; // enter 2121
k=a/1000;
cout<<"the number you entered is: "<< endl;
cout<<k<<"\n";
a=a%1000;
b=a/100;
cout<<b<<"\n";
b=a%100;
a=b/10;
cout<<a<<"\n";
a=b%10;
cout<<a<<"\n";
return 0;}
```

Example (4) :- W.P to swaps the values of a & b if a greater than b?

Solution:-

```
#include <iostream.h>
int main ( ){
int w,a, b;
cout<<" Enter the number "<<endl;
cin>>a>> b;
if (a>b)
{w=a;
a=b;
b=w;}
return 0;}
```

Example (5) :- W.P to print the name of the day in the week, by using switch statement and then if statement?

Solution.-

```
# include<iostream.h>
int main(){
int day;
Switch(day){
case 1: cout<<" The day is Saturday"<<endl; break;
case 2: cout<<" The day is Sunday"<<endl; break;
case 3: cout<<" The day is Monday"<<endl; break;
case 4: cout<<" The day is Tuesday"<<endl; break;
case 5: cout<<" The day is Wednesday"<<endl; break;
case 6: cout<<" The day is Thursday"<<endl; break;
case 7: cout<<" The day is Friday"<<endl; break;
default: cout<<"Not a legal day"<<"\n";}
return 0;}
```

Solution (if statement):-

```
# include<iostream.h>
int main()
{
int day;
if (day==1)
```

```

cout<<" The day is Saturday"<<endl;
else if (day==2)
    cout<<" The day is Sunday"<<endl;
else if (day==3)
    cout<<" The day is Monday"<<endl;
else if (day==4)
    cout<<" The day is Tuesday"<<endl;
else if (day==5)
    cout<<" The day is Wednesday"<<endl;
else if(day==6)
    cout<<" The day is Thursday"<<endl;
else if(day==7)
    cout<<" The day is Friday"<<endl;
else
    cout<<"Not a legal day"<<"\n";
return 0;
}

```

H.W:-

1- W.P that reads in any number and prints the following:-

- a) The number itself.
- b) The square of the number.
- c) The cube of the number.

2- W.P to reverse the digits order of the 4 digits number you entered?

3- W.P to read two integers compare between them if they are equal or not using if statement?

4-W.P that reads the value of a, b and x, then computes z as follows and prints it on a separate line:-

$$\begin{aligned}
 & (a + b^2 - 3)/4a \quad \text{if } x \geq 1 \\
 Z = & (b + 5)/10 \quad \text{if } x \leq -1 \\
 & a^2 + b + 2 \quad \text{otherwise}
 \end{aligned}$$

5- W.P to read the mark and name of student , then selects if it is excellent, good, or fail using switch selection structure?