

# Programming Language

## Using C++

control structure of C++ program

### Lecture #11-a



# Basic Branches

**Ability to control whether a statement list is executed**

➤ **There are two common types of loops**

✓ **if statement**

- **if**
- **if-else**
- **if-else-if**

✓ **switch statement**

# The Basic if Statement

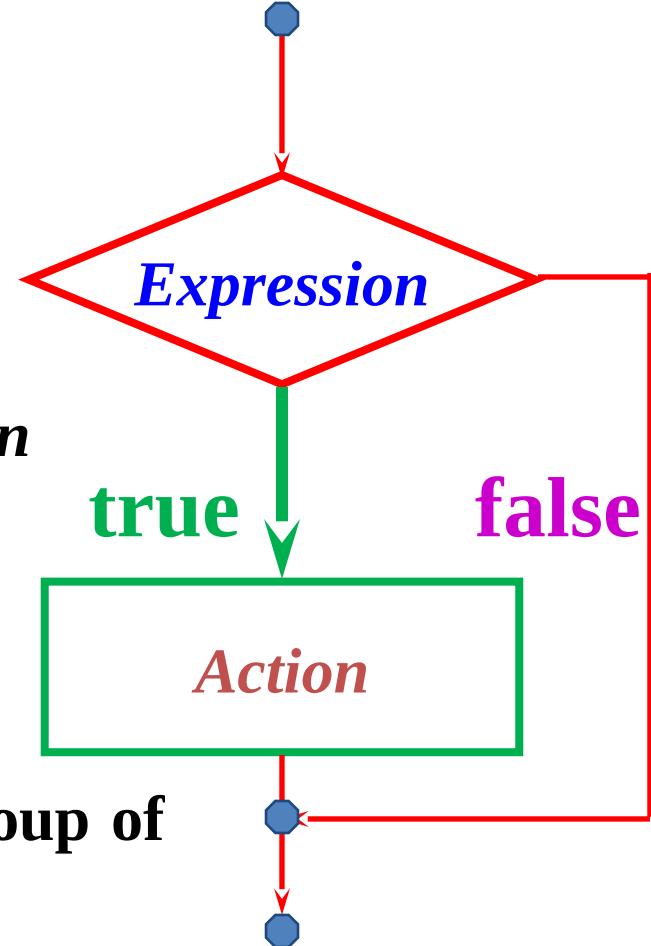
- Syntax

**if (*Expression*)**

**Action**

- If the *Expression* is true then execute *Action*

- *Action* is either a single statement or a group of statements within braces



# // program to sort two numbers in ascending order

```
#include <iostream>
using namespace std;
int main( ) {
    int value1, value2, remembervalue1;
    cout << "Enter two integers: ";
    cin >> Value1 >> Value2;
    if (Value1 > Value2) {
        remembervalue1= value1;
        value1 = value2;
        value2 = rememberValue1;
    }
    cout << "The two sorted input: " << Value1 << "\t " << Value2 << endl;
    return 0;
}
```

# The if-else Statement

- Syntax

```
if (Expression)
```

```
    Action1
```

```
else
```

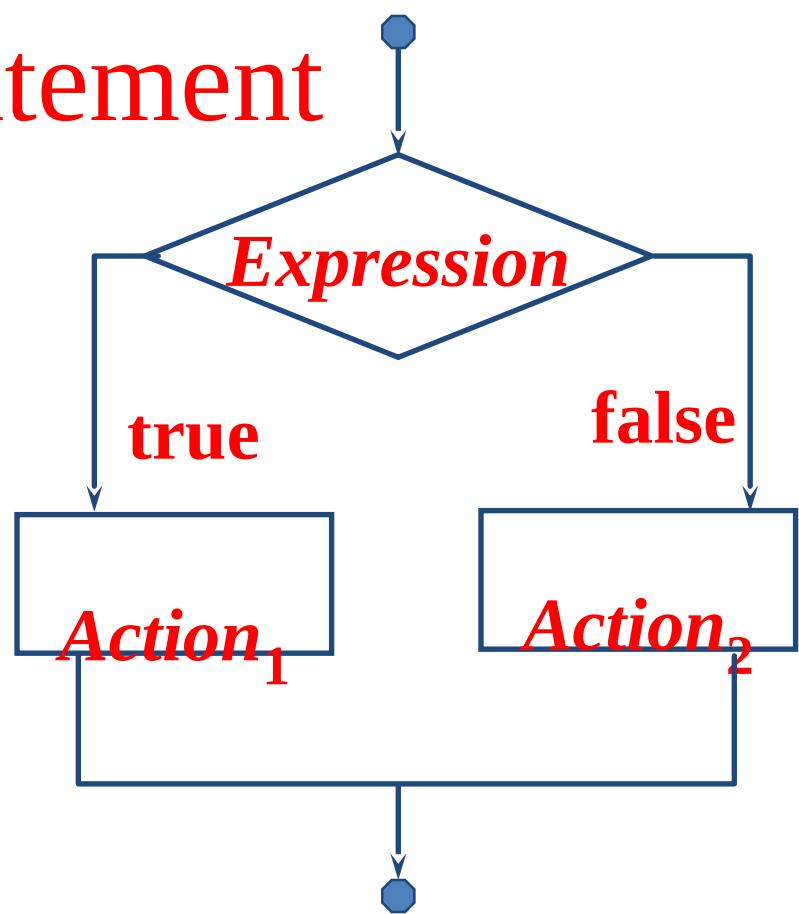
```
    Action2
```

- If *Expression* is true then execute

Action1 otherwise execute Action2

//testing whether the number is zero or  
not

```
if (v == 0) {  
    cout << "v is 0";  
}  
else {  
    cout << "v is not 0";  
}
```



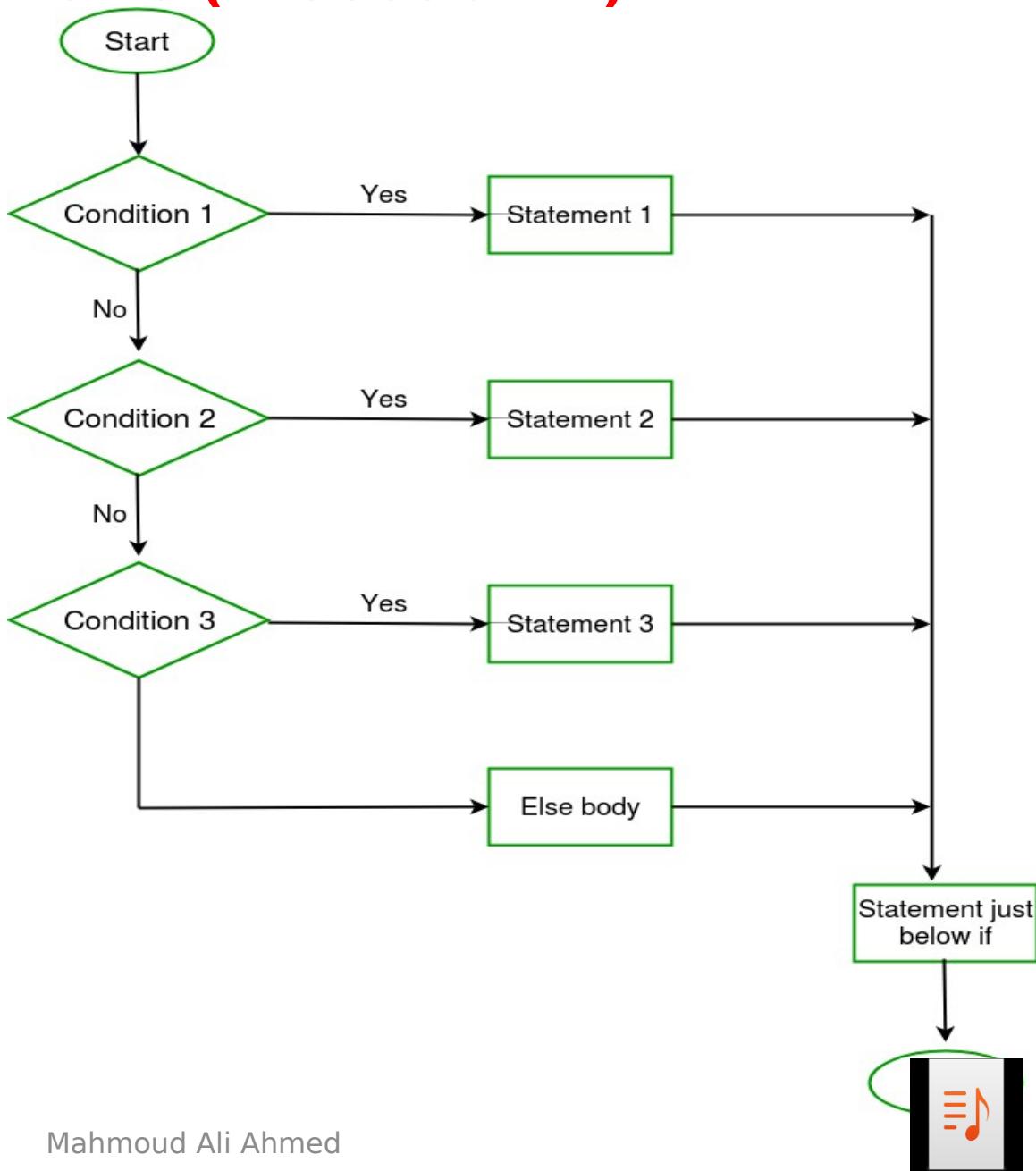
# //Program to finding the Max of two integers

```
#include <iostream>
using namespace std;
int main() {
    int Value1, Value2, max;
    cout << "Enter two integers: ";
    cin >> Value1 >> Value2;
    if (Value1 < Value2) {
        max = Value2;
    }
    else {
        max = Value1;
    }
    cout << "Maximum of inputs is: " << max << endl;
    return 0;
}
```



# if-else-if Statement (nested if)

```
if (condition1){  
    actions(1);  
}  
else if (condition2) {  
    actions(2);  
}  
:  
else {  
    actions(else);  
}  
Action(s)
```



# //program to determine whether the number is neg, pos, or zero

```
include <iostream>
using namespace std;
int main( ) {
    int nbr;
    cin>>nbr;
    if ( nbr < 0 ){
        cout << nbr << " is negative" << endl;
    }
    else if ( nbr > 0 ) {
        cout << nbr << " is positive" << endl;
    }
    else {
        cout << nbr << " is zero" << endl;
    }
    return 0;
}
```



# switch Statement

General Syntax:

```
switch (variable) {
```

```
    case value1:
```

```
        //action(s); break;
```

```
    case value2:
```

```
        //action(s); break;
```

```
:
```

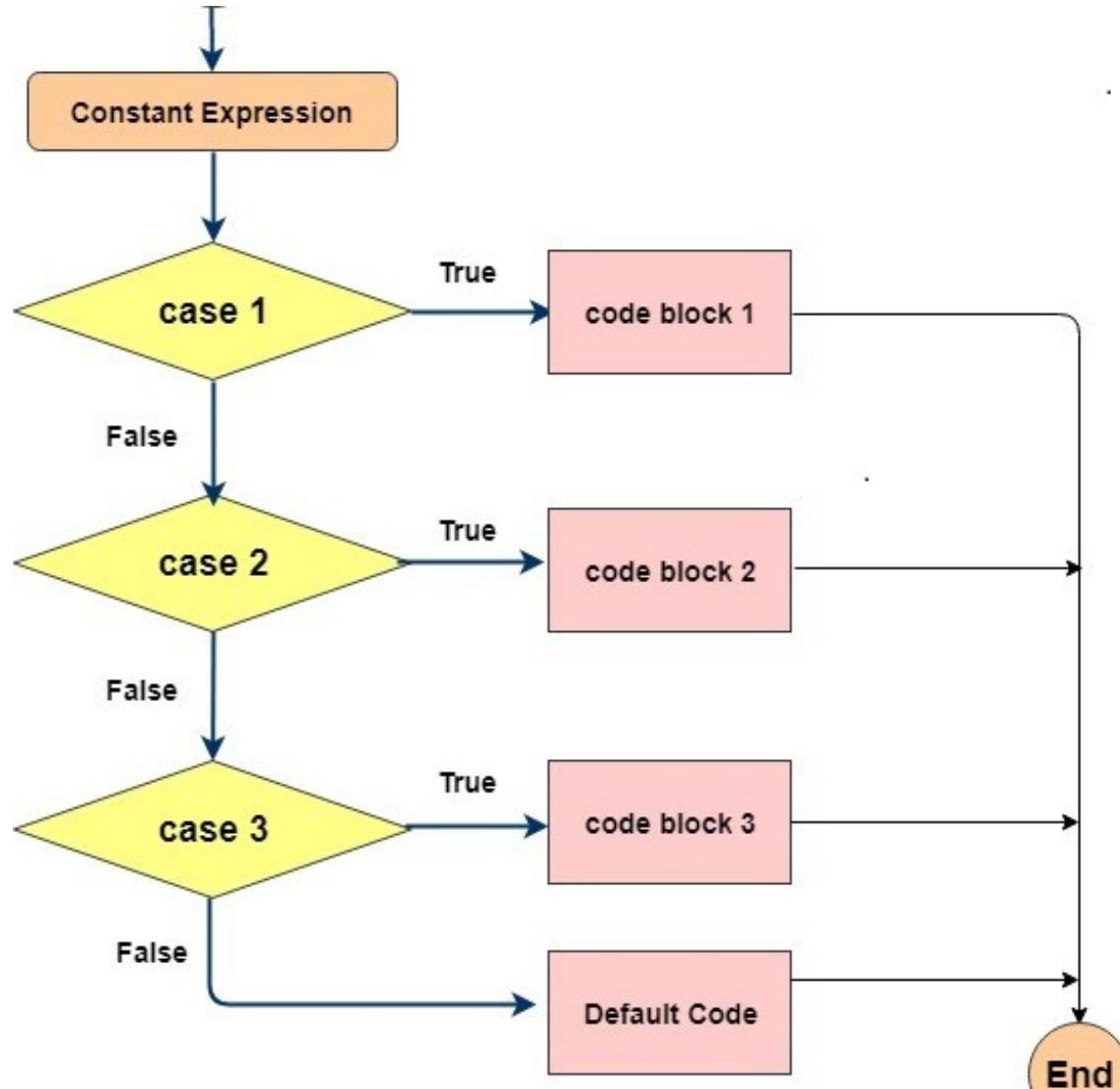
```
    case valuen:
```

```
        //action(s); break;
```

```
default:
```

```
    //action(s);
```

```
}
```



```
//program to test whether the letter is vowel letter or not
include <iostream>
using namespace std;
int main( ) {
    char ch;
    cin>>ch;
    switch (ch) {
        case 'a': case 'A':
        case 'e': case 'E':
        case 'i': case 'I':
        case 'o': case 'O':
        case 'u': case 'U':
            cout << ch<< " is a vowel" << endl;
            break;
        default:
            cout << ch << " is not a vowel" << endl;
    }
    return 0;
}
```



# program to carry mathematical operations//

```
include <iostream>
using namespace std;
int main( ) {
    int Left, Right;
    char Operator;
    cout << "Enter simple expression: ";
    cin >> Left >> Operator >> Right;
    cout << Left << " " << Operator << " " << Right << " = ";
    switch (Operator) {
        case '+': cout << Left + Right << endl; break;
        case '-': cout << Left - Right << endl; break;
        case '*': cout << Left * Right << endl; break;
        case '/': cout << Left / Right << endl; break;
        default: cout << "Illegal operation" << endl;
    }
    return 0;
}
```



# Examples



# Example #1

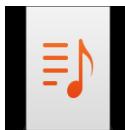
**Write C++ program to swap any two random numbers.**



```
#include <iostream>
using namespace std;
int main(){
    float a, b, temp;
    cout<<"Enter values of a and b:\t";
    cin>>a>>b;
    cout << "\n Before swapping." << endl;
    cout << "a = " << a << ", b = " << b << endl;
    temp = a;      a = b;      b = temp;
    cout << "\n After swapping." << endl;
    cout << "a = " << a << ", b = " << b << endl;
    return 0;
}
```

## Example #2

Write C++ program to read two integer numbers  $a$  and  $b$ .  
if  $a$  is greater than  $b$ , print out  $a$  is the greater number and  
the difference is equal to  $(a-b)$ . if  $b$  is greater than  $a$ , print  
out  $b$  is the greater number and the difference between is  
equal to  $(b-a)$ . Using if-else statement



```
#include <iostream>
using namespace std;
int main( )
{
    int a, b;
    cout<<“Enter the two numbers a and b:”
    cin>>a;
    cin>>b;
    if(a>b)
    {
        cout<<“\n” <<a<<“ is the greater number”<<endl;
        cout <<“The difference between them = ” <<a-b<<endl;
    }
    else
    if(b>a)
    {
        cout<<“\n” <<a<<“ is the greater number”<<endl;
        cout <<“The difference between them = ” <<a-b<<endl;
    }
    return 0;
}
```



## Assignment (Example #3

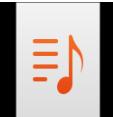
Write C++ program that calculate the net salary of an employee. The net salary is given by:

**net salary = basic + allowance - deduction**

Test whether the net salary is under tax or not. It will be under tax if it is equal to 3 times the allowance.



```
#include <iostream>
using namespace std;
main( )
{
    float net, basic, allowance, deduction;
    cout<<“Enter basic salary, allowance, and deduction”
    cin>>basic;
    cin>>allowance;
    cin>>deduction;
    net = basic + allowance – deduction;
    if(net == 3*allowance)
    {
        cout<<“\n The net salary is under tax”<<endl;
    }
    else
    {
        cout<<“\n The net salary is not under tax”<<endl;
    }
    return 0;
}
```



## Example #4

**Write C++ program to read a student testscore and evaluate it as follow:**

**>= 75: “A”**

**>= 65: “B”**

**>= 55: “C”**

**>= 40: “D”**

**<40: “F”**



```
#include <iostream>
using namespace std;
int main( )
{
    int testscore; char grade;
    cout<<“Enter student testscore:”
    cin>>testscore;
    if(testscore>=75)
    {
        grade = “A”;
    }
    else if(testscore>=65)
    {
        grade = “B”;
    }
    else if(testscore>=55)
    {
        grade = “C”;
    }
}
```



```
else if(testscore>=40)
    {
        grade = “D”;
    }
else {
    grade = “F”
}
cout << “\n The student grade is “ <<grade;
return 0;
}
```

