

Department of Cybersecurity Technologies Engineering

PROGRAMMING ESSENTIALS

Lecture 4: IF Statement



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Lecture 4: IF Statement

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Lecture 4: IF Statement

C++ If-else Statements

In C++ programming, if statement is used to test the condition. There are various types of if statements in C++.

1. if statement
2. if-else statement
3. nested if statement

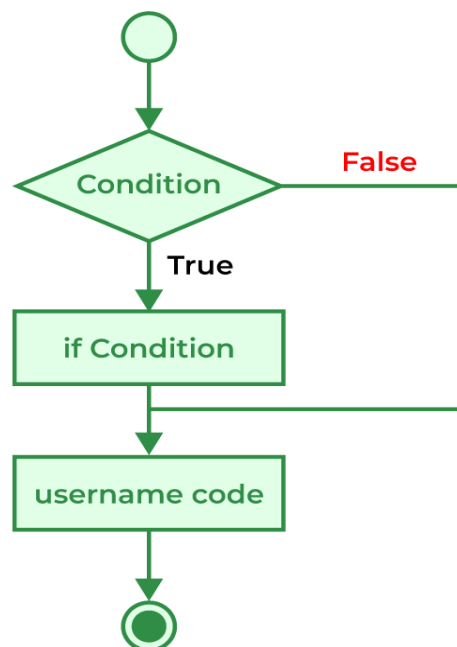
Conditional Statements are used in C++ to run a certain piece of program only if a specific condition is met.

1. If Statement:

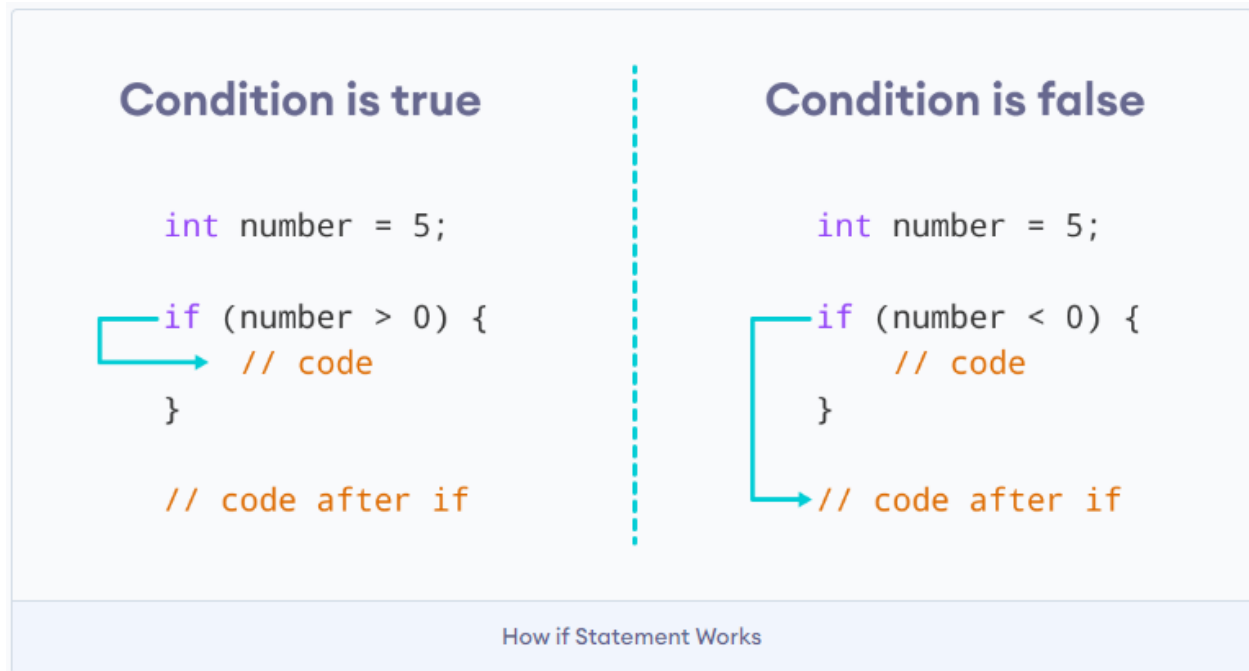
The C++ if statement tests the condition. It is executed if condition is true.

Syntax:

```
if (Boolean_expression or Condition)
{ // statement(s) will execute if the Boolean expression(Condition) is true }
```



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**Example 1: Program to print positive number entered by the user using if statement**

```
#include <iostream>
using namespace std;
int main() {
    int number;
    cout << "Enter an integer: ";
    cin >> number;
    // checks if the number is positive
    if (number > 0) {
        cout << "You entered a positive integer: " << number << endl;
    }
    cout << "This statement is always executed.";
    return 0;
}
```

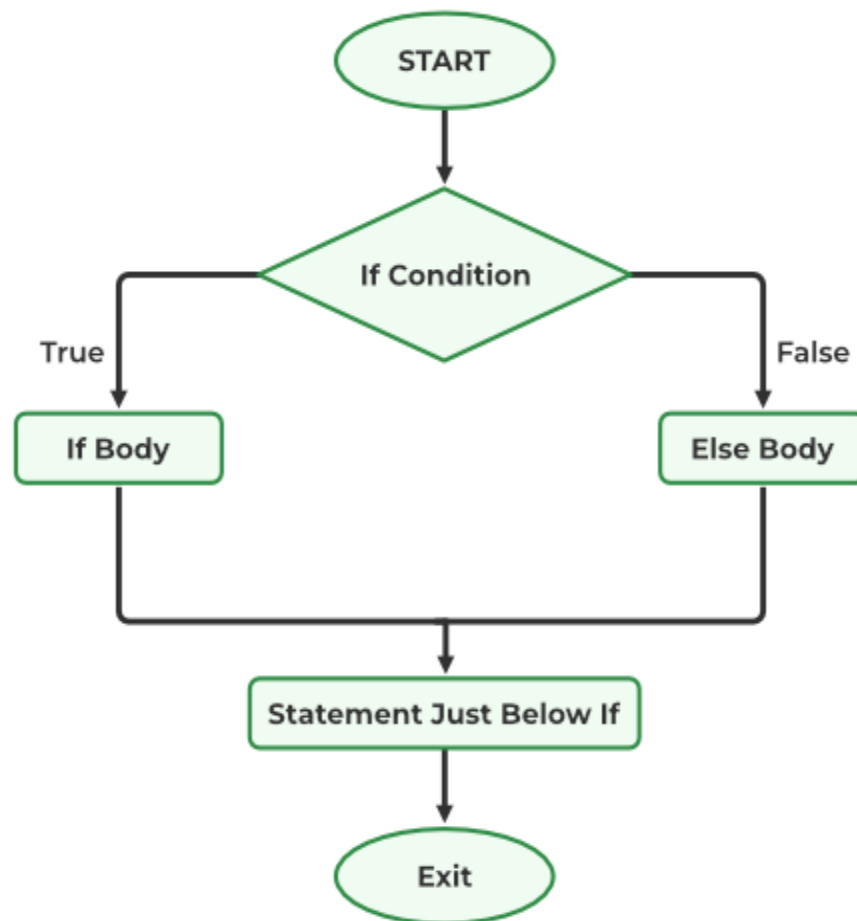
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2. IF-else Statement

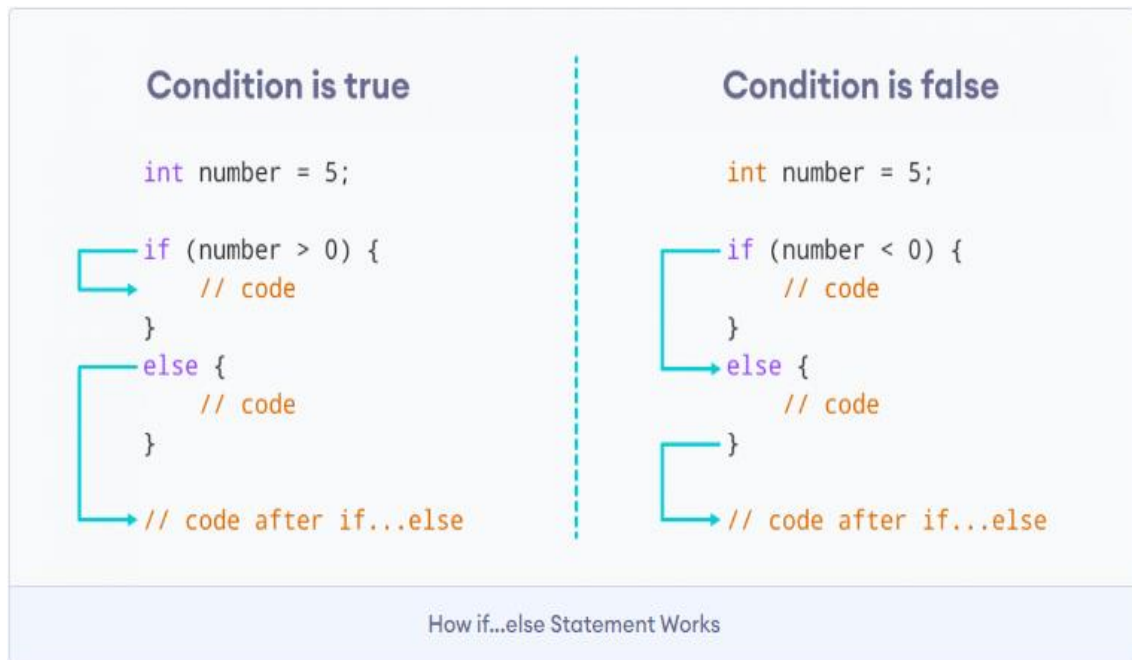
The C++ if-else statement also tests the condition. It executes if block if condition is true otherwise else block is executed.

Syntax:

```
if (Boolean expression or Condition)
{ // statement(s) will execute if the Boolean expression(Condition) is true }
else
{ // statement(s) will execute if the boolean expression (Condition) is false }
```



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Example 2: Program to check whether an integer is positive or negative using if .. else statement

```
#include <iostream>
using namespace std;
int main()
{
    int number;
    cout << "Enter an integer: ";
    cin >> number;
    if (number >= 0)
    {
        cout << "You entered a positive integer: " << number << endl;
    }
    else
    {
        cout << "You entered a negative integer: " << number << endl;
    }
    cout << "This line is always printed.";
    return 0;
}
```

*Lecture 4: IF Statement***3. if...else if...else Statement (Nested If)**

An **if** statement can be followed by an optional **else if...else** statement, which is very useful to test various conditions using single if...else if statement.

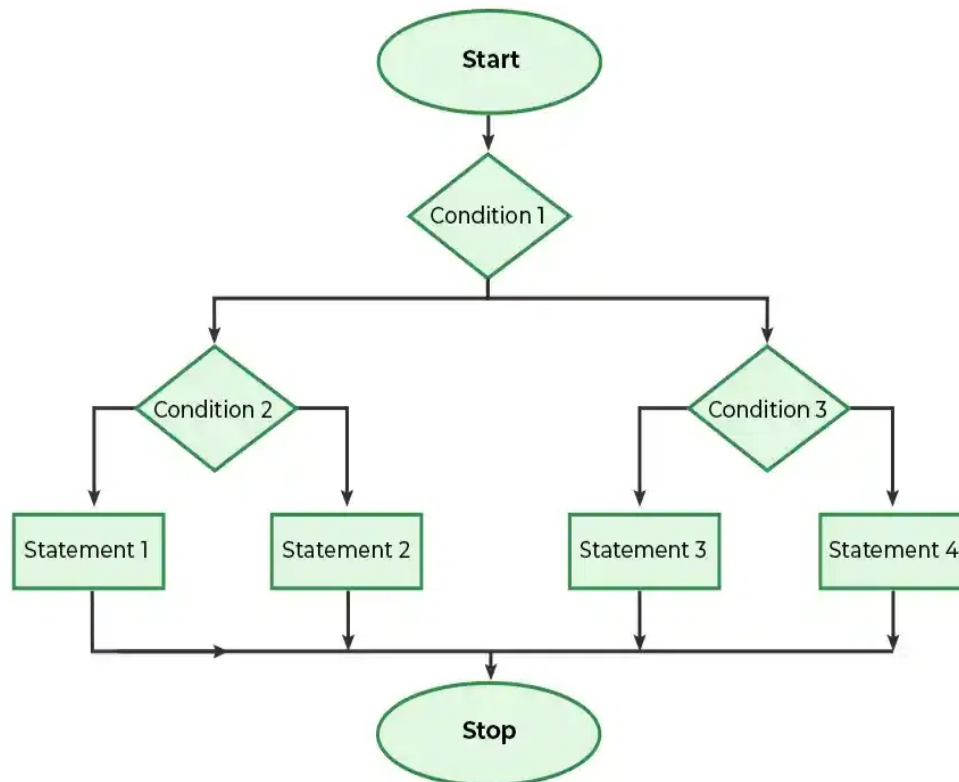
When using if , else if , else statements there are few points to keep in mind.

- An if can have zero or one else's and it must come after any else if's.
- An if can have zero to many else if's and they must come before the else.
- Once an else if succeeds, none of the remaining else if's or else's will be tested.

Syntax:

```
if (Boolean expression 1)
{
// Executes when the Boolean expression 1 is true
}
else if(Boolean expression 2)
{
// Executes when the Boolean expression 2 is true
}
else if( Boolean expression 3)
{
// Executes when the Boolean expression 3 is true
} else
{
// executes when the none of the above condition is true }
```

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1st Condition is true

```
int number = 2;
if (number > 0) {
    // code
}
else if (number == 0){
    // code
}
else {
    //code
}
//code after if
```

2nd Condition is true

```
int number = 0;
if (number > 0) {
    // code
}
else if (number == 0){
    // code
}
else {
    //code
}
//code after if
```

All Conditions are false

```
int number = -2;
if (number > 0) {
    // code
}
else if (number == 0){
    // code
}
else {
    //code
}
//code after if
```

How if...else if...else Statement Works

*Lecture 4: IF Statement***Example 3: Program to check whether an integer is positive, negative or zero using Nested If statement**

```
#include <iostream>
using namespace std;
int main()
{
    int number;
    cout << "Enter an integer: ";
    cin >> number;
    if (number > 0)
    {
        cout << "You entered a positive integer: " << number << endl;
    }
    else if (number < 0)
    {
        cout << "You entered a negative integer: " << number << endl;
    }
    else
    {
        cout << "You entered 0." << endl;
    }
    cout << "This line is always printed.";
    return 0;
}
```

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Practical Programs:

Program 1: Write a program asks student to enter his mark ,then checks if student passed or failed and print result?

```
#include<iostream>
using namespace std;
int main()
{
    int mark;
    cout<<"enter your mark:";
    cin>>mark;
    if(mark>=50)
        cout<<"the student pass";
    else
        cout<<"the student fail";
    return 0;
}
```

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Program 2: Write a program asks student to enter his mark ,then checks if student passed or failed or invalid entry and print result?

```
#include<iostream>
using namespace std;
int main()
{
    int mark;
    cout<<"enter your mark:";
    cin>>mark;
    if(mark>100 || mark<0)
        cout<<"invalid entry";
    else if(mark>=50)
        cout<<"The Student Pass";
    else cout<<"The Student Fail";
    return 0;
}
```

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Program 3: Write a program that asks the student to enter his grade and then prints the grade corresponding to the student mark?

```
#include<iostream>
using namespace std;
int main()
{
    int mark;
    cout<<"Enter Student Marks: "<<endl;
    cin>>mark;
    if(mark>100 || mark<0)
        cout<<"invalid entry";
    else if(mark>=90)
        cout<<"A";
    else if(mark>=80)
        cout<<"B";
    else if(mark>=70)
        cout<<"C";
    else if(mark>=60)
        cout<<"D";
    else cout<<"F";
    return 0;
}
```

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Program 4: write a program that ask user to enter the number of week day and prints the equivalent week day name?

```
using namespace std;
int main()
{
    int daynumber;
    cout<<"enter the day number:";
    cin>>daynumber;
    if(daynumber==1)
        cout<<"Saturday";
    else if(daynumber==2)
        cout<<"Sunday";
    else if(daynumber==3)
        cout<<"Monday";
    else if(daynumber==4)
        cout<<"Tuesday";
    else if(daynumber==5)
        cout<<"Wednesday";
    else if(daynumber==6)
        cout<<"Thursday";
    else if(daynumber==7)
        cout<<"Friday";
    if(daynumber>7 || daynumber<=0)
        cout<<"ERROR";
    return 0;
}
```

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Program 5: Write a program that ask user to enter the number and then check the number is even or odd and print the result?

```
#include<iostream>
using namespace std;
main()
{
int n;
cout << "Enter an integer number: ";
cin >> n;
if ( n % 2 == 0)
cout << n << " is even.";
else
cout << n << " is odd.";
}
```

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Program 6: Write a program that ask user to enter three numbers and then check what is the largest number and display it?

```
#include <iostream>
using namespace std;
int main()
{
    double n1, n2, n3;
    cout << "Enter three numbers: "<<endl;
    cin >> n1 >> n2 >> n3;
    //check if n1 is the largest number
    if(n1 >= n2 && n1 >= n3)
        cout << "Largest number: " << n1;
    //check if n2 is the largest number
    else if(n2 >= n1 && n2 >= n3)
        cout << "Largest number: " << n2;
    //if neither n1 nor n2 are the largest, n3 is the largest
    else
        cout << "Largest number: " << n3;
    return 0;
}
```

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Program 7: Write a program that ask user to enter the time and check the corresponding greetings with time?

```
#include <iostream>
using namespace std;
int main()
{
    double time;
    cout<<"Enter the time:"<<endl;
    cin>>time;
    if (time < 12.0)
    {
        cout << "Good morning.";
    }
    else if (time < 18.0 && time >= 12.0)
    {
        cout << "Good Afternoon.";
    }
    else
    {
        cout << "Good evening.";
    }
}
```

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Program 8: Write a Program to Check if a Number is Divisible By Second Number?

```
#include<iostream>
using namespace std;
int main()
{
    int first, second;

    cout << "Enter the numbers : ";
    cin >> first >> second;

    if (first % second == 0)
        cout << "First number " << first
            << " is divisible by second number "
            << second;
    else
        cout << "First number " << first
            << " is not divisible by second number "
            << second;
}
```