C++ if, if...else and Nested if...else

In this tutorial, we will learn about the if...else statement to create decision making programs with the help of examples.In computer programming, we use the if...else statement to run one block of code under certain conditions and another block of code under different conditions.

For example, assigning grades (A, B, C) based on marks obtained by a student.

- if the percentage is above 90, assign grade A
- if the percentage is above 75, assign grade B
- if the percentage is above 65, assign grade C

There are three forms of if...else statements in C++.

- if statement
- if...else statement
- if...else if...else statement

C++ if Statement

The syntax of the if statement is:

```
if (condition) {
  // body of if statement
}
```

The if statement evaluates the condition inside the parentheses ( ).

If the condition evaluates to true, the code inside the body of if is executed.

If the condition evaluates to false, the code inside the body of if is skipped.

Note: The code inside { } is the body of the if statement.

Example 1: C++ if Statement

```cpp
// Program to print positive number entered by the user
// If the user enters a negative number, it is skipped

#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;
}
```

Output 1:

```
Enter an integer: 5
You entered a positive number: 5
This statement is always executed.
```

When the user enters 5, the condition number > 0 is evaluated to true and the statement inside the body of if is executed.

Output 2:

```
Enter a number: -5
This statement is always executed.
```

C++ if...else

The if statement can have an optional else clause. Its syntax is:

```cpp
if (condition) {
  // block of code if condition is true
}
else {
  // block of code if condition is false
}
```

If the condition evaluates true,

- the code inside the body of if is executed
- the code inside the body of else is skipped from execution

If the condition evaluates false,

- the code inside the body of else is executed
- the code inside the body of if is skipped from execution

C++ if...else...else if statement

The if...else statement is used to execute a block of code among two alternatives. However, if we need to make a choice between more than two alternatives, we use the if...else if...else statement.

The syntax of the if...else if...else statement is:

```cpp
if (condition1) {
  // code block 1
}
else if (condition2){
  // code block 2
}
else {
  // code block 3
}
```

Here,

- If condition1 evaluates to true, the code block 1 is executed.
- If condition1 evaluates to false, then condition2 is evaluated.
- If condition2 is true, the code block 2 is executed.
- If condition2 is false, the code block 3 is executed.

C++ Nested if...else

Sometimes, we need to use an if statement inside another if statement. This is known as nested if statement.

Think of it as multiple layers of if statements. There is a first, outer if statement, and inside it is another, inner if statement. Its syntax is:

```cpp
// outer if statement
if (condition1) {

  // statements

  // inner if statement
  if (condition2) {
    // statements
  }
}
```