Lab No. 5: Selection Structures

Objective:

This lab is about the selection structure and understanding the types of selection structure.

Description:

Selection: decisions, branching; when there are 2 or more alternatives. There are three types of selection structure:

- if
- if...else

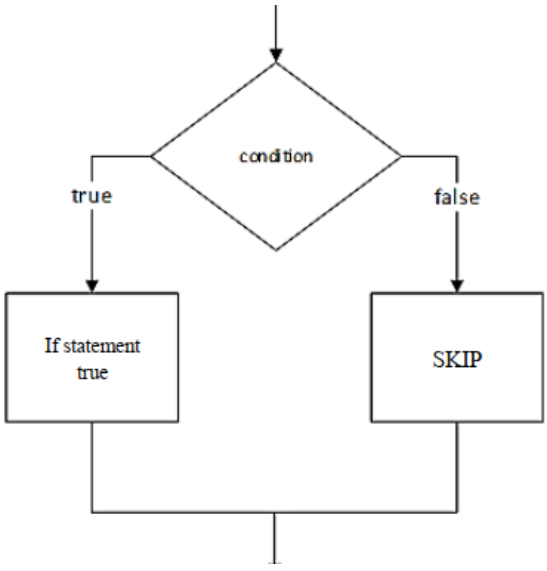
If Statement

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



How if statement works:

Test expression is true

```
int test = 5;

if (test < 10)
{
  // codes
}

// codes after if
```

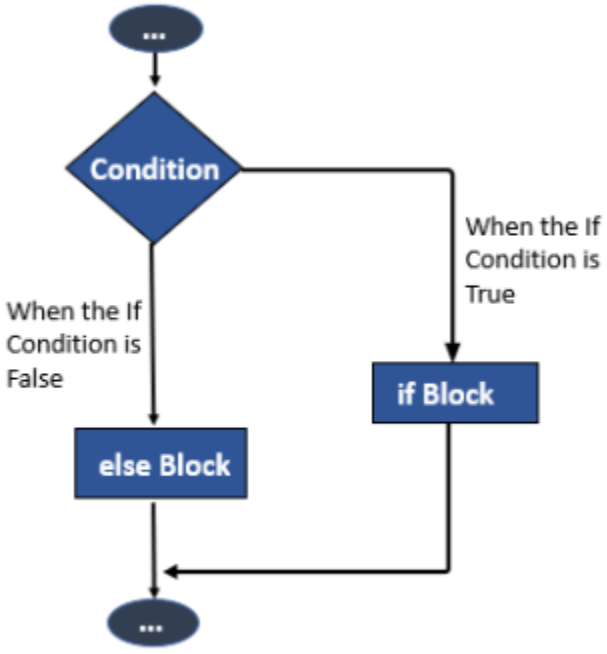
Test expression is false

```
int test = 5;

if (test > 10)
{
  // codes
}

// codes after if
```

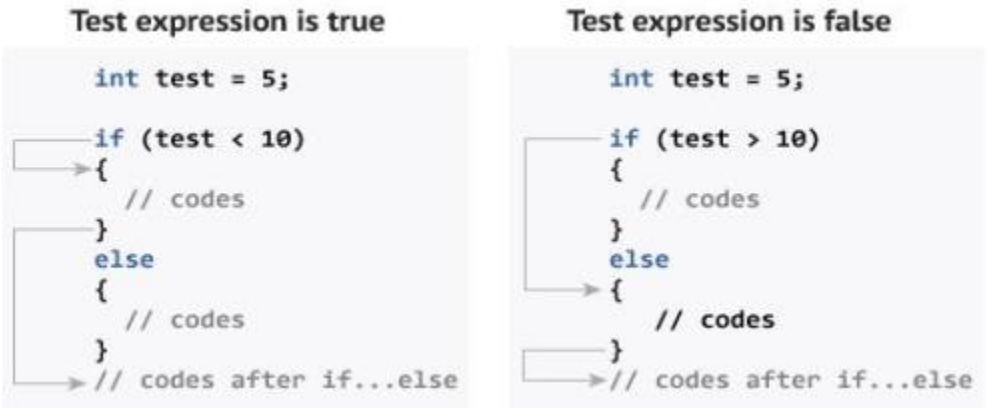
If.. else statement:

- If condition returns true then the statements inside the body of "if" are executed and the statements inside body of "else" are skipped
- If condition returns false then the statements inside the body of "if" are skipped and the statements in "else" are executed

```
if(condition) {
   // Statements inside body of if
}
else {
   //Statements inside body of else
}
```



How If-else statement works:



If 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.

```
if (condition1) {
  // block of code to be executed if condition1 is true
} else if (condition2) {
  // block of code to be executed if the condition1 is false and condition2 is true
} else {
  // block of code to be executed if the condition1 is false and condition2 is false
}
```

- 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

In the following example the user can input a number. The number is stored in the variable A. Now take a look at the “if statement”: if the number stored in the variable A is equal to ten, then “is equal” is printed on the screen. Simple, isn’t it. If the number is not equal to ten, then nothing is printed.

Take a look at the example:

```
#include <iostream>
using namespace std;
int main()
{
    int a;
    cout<< "enter number=";
    cin>> a;
    if(a==10)
    {
        cout<< "a is equal to 10";
    }
    return 0;
}
```

Now we like to also print something if the “if statement” is not equal. We could do this by adding another “if statement” but there is an easier / better way. Which is using the so called “else statement” with the “if statement”.

```
#include<iostream>
using namespace std;
int main()
{
    int a;
    cin >> a;
    if ( a == 10 )
    {
        cout << " a is equal to 10" << '\n';
        cout << "closing program" << '\n';
    }
    else
    {
            cout << " a is not equal to 10" << '\n';
            cout << "closing program" << '\n';
    }
    return 0;
}
```

TASKS:

1. Write a C++ program that checks the age of Fahad and Khurram and displays the appropriate message using if statements only
2. Write a C++ program that checks the age of Fahad and Khurram and displays the appropriate message using if - else statements only
3. Write a C++ program that checks the age of Fahad and Khurram and displays the appropriate message using nested if statements only
4. Write a C++ program, take an integer value from user and check if it's greater than 10 and less than or equal to 20. Print 1 if yes and print 0 if no
5. Write a C++ program, take two strings as input from user and check if both strings are equal or not.
6. Using if-else, determine whether the value is Even or Odd.
7. Write a C++ program that prompts the user to input three integer values and find the greatest value of the three values.
(Hint: Use logical operator)
8. Write a C++ program to check whether an alphabet entered by user is a vowel (lower and upper case) or a consonant (lower and upper case) using if else statement.
(Hint: Use logical operator)
9. Write a C++ program that prompts the user to input temperature in centigrade and display a message according to temperature state below:

    Temp < 0 then Freezing weather
    Temp 0-12 then Very Cold weather
    Temp 12-22 then Cold weather
    Temp 22-32 then Normal in Temperature
    Temp 32-42 then Its Hot
    Temp >=42 then Its Very Hot

10. Write a C++ program that take quiz marks, midterm marks and final term marks from user and determine the student's grade based on the following rules:

    if the average mark is greater than and equal to 95, grade will be A+
    if the average mark greater than and equal to 85 and less than 95, grade will be A

if the average mark greater than and equal to 75 and less than 85, grade will be B
if the average mark greater than and equal to 55 and less than 75, grade will be C
if the average mark less than 55, grade will be F