Multiple
IF Statements
And
IF Else Statement

Comparison Operators list

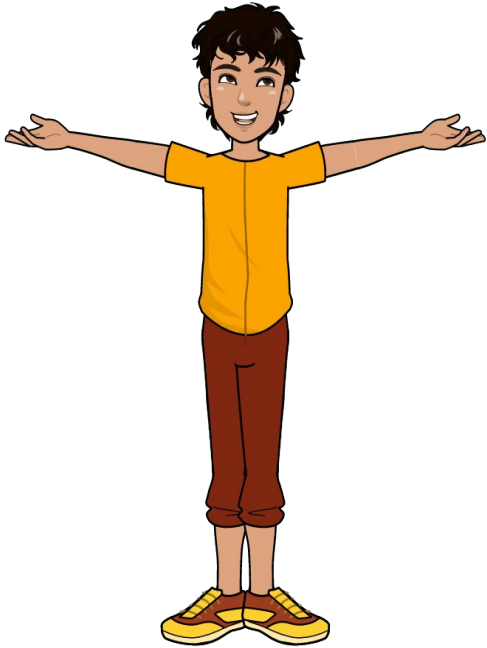
Comparison Operators	Description	Applicable on	Example
==	Equal to	Textual Data Numeric Data	if ("AB" == "AC") if (5 == 5)
!=	Not equal to	Textual Data Numeric Data	if ("AB" != "AC") if (5 != 3)
<	Less than	Numeric Data	if (2 > 4)
>	Greater Than	Numeric Data	if (4 < 4)
<=	Less than or equal to	Numeric Data	if (5 <= 90)
>=	Greater than or equal to	Numeric Data	if (66 >= 21)

Review: Working Example

Write a program that takes marks of one subject from the user. If marks are more than 50 it displays "You passed" and "Program ends" and if marks are lesser than 50 it displays only "Program ends".

Review: Solution

```
1   #include <iostream>
2   using namespace std;
3   main(){
4       int marks;
5       cout<<"Please Enter Marks: ";
6       cin>>marks;
7       if(marks > 50){
8           cout<<"You are Passed "<<endl;
9       }
10      cout<<"Program Ends";
11  }
```



What Updates?

What if we want to print "You are Passed" when Marks are greater than 50 but print "You are Failed" when Marks are less than or equal to 50.

```
1   #include <iostream>
2   using namespace std;
3   main(){
4       int marks;
5       cout<<"Please Enter Marks: ";
6       cin>>marks;
7       if(marks > 50){
8           cout<<"You are Passed "<<endl;
9       }
10      cout<<"Program Ends";
11  }
```

What Updates?

What if we want to print "You are Passed" when Marks are greater than 50 but print "You are Failed" when Marks are less than or equal to 50.

Can we solve this problem with single IF statement?

What Updates?

What if we want to print "You are Passed" when Marks are greater than 50 but print "You are Failed" when Marks are less than or equal to 50.

We solve this problem with multiple IF statements

```
if( condition1 ){
    do this
}
if( condition2 ){
    do this
}
```

What Conditions?

What if we want to print "You are Passed" when Marks are greater than 50 but print "You are Failed" when Marks are less than or equal to 50.

we solve this problem with multiple IF statements?

```
if( marks > 50 ){
    cout << "You are passed";
}
if( marks <= 50 ){
    cout << "You are failed";
}
```

Multiple IF conditions

```
1   #include<iostream>
2   using namespace std;
3   main(){
4       int marks;
5       cout << "Please Enter Marks : ";
6       cin >> marks;
7       if(marks > 50){
8           cout << "You are Passed" << endl;
9       }
10      if(marks <= 50){
11          cout << "You are Failed" << endl;
12      }
13       cout << "Program Ends";
14  }
```

Previous Example

What if we want to print "You are Passed" when Marks are greater than 50 but print "You are Failed" when Marks are less than or equal to 50.

Conditions are Contradicting

```
1   #include<iostream>
2   using namespace std;
3   main(){
4       int marks;
5       cout << "Please Enter Marks : ";
6       cin >> marks;
7       if(marks > 50){
8           cout << "You are Passed" << endl;
9       }
10      if(marks <= 50){
11          cout << "You are Failed" << endl;
12      }
13       cout << "Program Ends";
14  }
```

IF-Else Block

What if we want to print "You are Passed" when Marks are greater than 50 but print "You are Failed" when Marks are less than or equal to 50.

Conditions are Contradicting

```
1   #include<iostream>
2   using namespace std;
3   main(){
4       int marks;
5       cout << "Please Enter Marks : ";
6       cin >> marks;
7       if(marks > 50){
8           cout << "You are Passed" << endl;
9       }
10      else{
11          cout << "You are Failed" << endl;
12      }
13       cout << "Program Ends";
14  }
```

Which one is Better?

Multiple IFs

```
#include<iostream>
using namespace std;
main(){
    int marks;
    cout << "Please Enter Marks : ";
    cin >> marks;
    if(marks > 50){
        cout << "You are Passed" << endl;
    }
    if(marks <= 50){
        cout << "You are Failed" << endl;
    }
     cout << "Program Ends";
}
```

If Else

```
#include<iostream>
using namespace std;
main(){
    int marks;
    cout << "Please Enter Marks : ";
    cin >> marks;
    if(marks > 50){
        cout << "You are Passed" << endl;
    }
    else{
        cout << "You are Failed" << endl;
    }
     cout << "Program Ends";
}
```

IF-Else is better

Multiple IFs

```
#include<iostream>
using namespace std;
main(){
    int marks;
    cout << "Please Enter Marks : ";
    cin >> marks;
    if(marks > 50){
        cout << "You are Passed" << endl;
    }
    if(marks <= 50){
        cout << "You are Failed" << endl;
    }
     cout << "Program Ends";
}
```

TRUE

FALSE

If Else

```
#include<iostream>
using namespace std;
main(){
    int marks;
    cout << "Please Enter Marks : ";
    cin >> marks;
    if(marks > 50){
        cout << "You are Passed" << endl;
    }
    else{
        cout << "You are Failed" << endl;
    }
     cout << "Program Ends";
}
```

FALSE

Multiple IF: Inevitable Cases

Sometimes, Conditions are not Contradicting but we have to make Different Decisions for Different Conditions.

Multiple IF: Working Example

Let's Write a Program for Fruit Shop but the shop has one restriction that Customer can only buy one fruit at time. Customer enjoys following Discounts:

Fruits	Discount
Apple	20%
Mango	15%
Grapes	10%

The discount applies on total amount. For simplicity, let take the 2$ price per kg for every Fruit.
The Program takes Fruit Name and Number of KGs as Input that customer has bought. The Output of the Program will be the actual amount, discount and payable after discount.

Multiple IF: Working Example

The Program takes Fruit Name and Number of KGs as Input that customer has bought.

Fruits	Discount
Apple	20%
Mango	15%
Grapes	10%

```
if( condition1 ){
    do this
}
if( condition2 ){
    do this
}
if( condition3 ){
    do this
}
```

Multiple IF: Working Example

The Program takes Fruit Name and Number of KGs as Input that customer has bought.

Fruits	Discount
Apple	20%
Mango	15%
Grapes	10%

```
if( fName == "Apple" ){
    do this
}
if( fName == "Mango" ){
    do this
}
if( fName == "Grapes" ){
    do this
}
```

Multiple IF: Working Example

```
1   #include <iostream>
2   using namespace std;
3   int main(){
4       string fname;
5       float kiloGram, price, discount, payable;
6       cout << "Fruit Name: ";
7       cin >> fName;
8       cout << "Number of KGs: ";
9       cin >> kiloGram;
10      price = kiloGram * 2;
11      if (fName == "Apple"){
12          discount = price * 20 / 100;
13          payable = price - discount;}
14      if(fName == "Mango"){
15          discount = price * 15 / 100;
16          payable = price - discount;}
17      if(fName == "Grapes"){
18          discount = price * 10 / 100;
19          payable = price - discount;}
20      cout << "Actual Amount: " << price << endl;
21      cout << "Discounted Amount: " << discount << endl;
22      cout << "Payable after Discount: " << payable << endl;
23  }
```

Learning Outcome

In this lecture, we learnt how to write a C++ Program that solves the problem with **Multiple IF** Statement and sometimes with **IF-ELSE** block

Conclusion

- A program can have multiple if statements.
- Usually, we add multiple IF statements when we need to perform different tasks at different conditions
- If-else block is also one variation of conditional statement.
- Else block executes when the if condition attached with if-else block is false.
- Else block does not have any condition
- It is used when you have only two contradicting conditions in your problem

Self Assessment

Solve Following Programs

Ali is a student and he mostly gets confused when trying to differentiate between positive and negative values. He requires a program which helps him to convert grams into kilograms but if he enters a value in negative the program tells him "You entered the wrong value".

Self Assessment

Solve Following Programs

Take temperature in Fahrenheit from user and convert it into Celsius. If the temperature in Celsius is greater than or equal to 40, display "Its hot today" otherwise display "Nice weather"

Note: Use if else

$$C = \frac{5}{9}(F - 32)$$

Self Assessment

Solve Following Programs

Ask the user to enter marks of 5 subjects (Total marks for 5 subjects are 500) and calculate the percentage. If percentage is above or equal to 70 display "you are brilliant student" otherwise display "Keep working harder"

Note: Use if else