

Programming and Problem Solving through Python Language O Level / A Level

Chapter -4: Operators, Expressions and Python Statements

Decision Making within a Program

- Decision making is the selection of a course of action from among available alternatives in order to produce a desired result.
- The conditional test either evaluates to a true or a false.
- The concept of evaluating and obtaining a result is referred to as decision making in a programming language.
- "True" is considered the same as "yes," which is also considered the same as 1.
- "False" is considered the same as "no," which is considered the same as 0.
- Python programming language assumes any non-zero and non-null values as true, and if it is either zero or null, then it is assumed as false value.

Control Statement

- A control statement modifies the order of statement execution.
- A control statement can cause other program statements to execute multiple times or not to execute at all, depending on the circumstances.

Types of Control Statement

1) **Branching Statement** : used to select one of the alternative statement

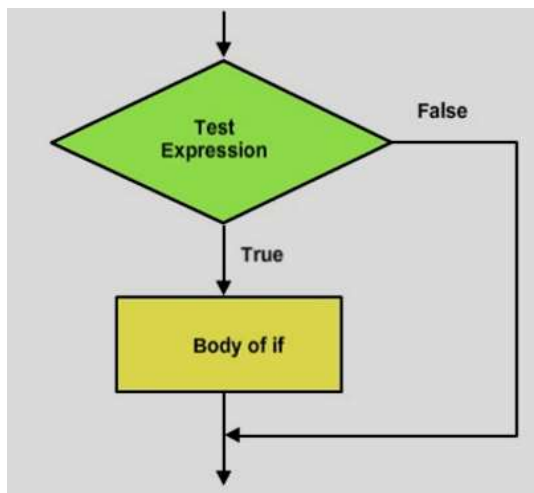
- i. if Statement
- ii. if-else Statement.
- iii. If-elif Statement

2) **Looping or Iterative Statement** : used to repeat the statement till the condition is true.

- i. for loop
- ii. while loop

If statement

- The 'if' statement is one of the Python's program control statements.
- The 'if' statement evaluates an expression and directs program execution depending on the result of the evaluation.
- If expression evaluates to true, statement is executed.
- If statement evaluates to false, statement is not executed.
- An 'if' statement can control the execution of multiple statements through the use of a compound statement, or block.
- A block is a group of two or more statements indented at same level.



If Syntax

```
if expression:  
    statement(s)
```

Example

```
var1 = 100  
if var1:  
    print ("1 - Got a true expression value")  
    print (var1)  
  
var2 = 0  
if var2:  
    print ("2 - Got a true expression value")  
    print (var2)  
print ("Good bye!")
```

Output

```
1 - Got a true expression value  
100  
Good bye!
```

Else Statement

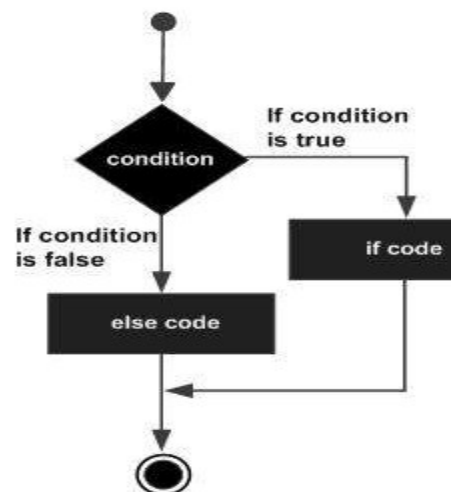
- An 'if' statement can optionally include an else clause.
- The else clause is included as shown below:
- If expression evaluates to true, statement1 is executed.
- If expression evaluates to false, statement2 is executed.
- Both statement1 and statement2 can be compound statements or block

If-else Statement

- The combination of the 'if' and 'else' clause is called the 'if-else' statement.
- If expression is true, statement1 is executed; otherwise, statement2 is executed.
- If the first expression, expression1, is true, statement1 is executed before the program continues with the next statement.

Syntax

```
if expression :  
    statement(s)  
else :  
    statement(s)
```



Example

```
var1 = 100  
if var1:  
    print ("1 - Got a true expression value")  
    print (var1)  
else:  
    print ("1 - Got a false expression value")  
    print (var1)
```

```
var2 = 0
if var2:
    print ("2 - Got a true expression value")
    print (var2)
else:
    print ("2 - Got a false expression value")
    print (var2)

print ("Good bye!")
```

Output

```
1 - Got a true expression value
100
2 - Got a false expression value
0
Good bye!
```

The *elif* Statement

The **elif** statement allows you to check multiple expressions for TRUE and execute a block of code as soon as one of the conditions evaluates to TRUE.

Syntax

```
if expression1 :
    statement(s)
elif expression2 :
    statement(s)
elif expression3 :
    statement(s)
else :
    statement(s)
```

Example

```
var = 100
if var == 200:
    print ("1 - Got a true expression value")
    print (var)
elif var == 150:
    print ("2 - Got a true expression value")
    print (var)
elif var == 100:
    print ("3 - Got a true expression value")
    print (var)
else:
    print ("4 - Got a false expression value")
    print (var)

print "Good bye!"
```

Output

```
3 - Got a true expression value
100
Good bye!
```

Assignment

- 1) Write a program to display the square and cube of a positive number.
- 2) Write a program to display the greater of 2 numbers.
- 3) Write a program to check an entered number is Odd or Even. [hint – use % modulus operator to determine the remainder]
- 4) Write a program to check an entered number is divisible by 7 or not.
- 5) In an examination, the grades are awarded to the students in ‘SCIENCE’ according to the average marks obtained in the examination.

Marks	Grades
80% and above	Distinction
60% or more but less than 80%	First Division
45% or more but less than 60%	Second Division
40% or more but less than 45%	Pass
Less than 40%	Promotion not granted

Write a program to input marks in Physics , Chemistry and Biology. Calculate the average marks. Display the average marks and grade obtained.