Python Control Statements

In any programming language a program may execute sequentially, selectively or iteratively. Every programming language provides constructs to support Sequence, Selection and Iteration. In Python all these construct can broadly categorized in 2 categories.

A. **Conditional Control Construct (Selection, Iteration)**
B. **Un- Conditional Control Construct (pass, break, continue, exit(), quit())**

Python have following types of control statements

1. **Selection (branching) Statement**
2. **Iteration (looping) Statement**
3. **Jumping (break / continue)Statement**

Conditional Control Statements

Un Conditional Control Statements

Python Iteration Statements

The iteration (Looping) constructs mean to execute the block of statements again and again depending upon the result of condition. This repetition of statements continues till condition meets True result. As soon as condition meets false result, the iteration stops.

Python supports following types of iteration statements

1. **while**
2. **for**

Four Essential parts of Looping:

i. **Initialization of control variable**
ii. **Condition testing with control variable**
iii. **Body of loop Construct**
iv. **Increment / decrement in control variable**

Python while loop

The while loop is conditional construct that executes a block of statements again and again till given condition remains true. Whenever condition meets result false then loop will terminate.

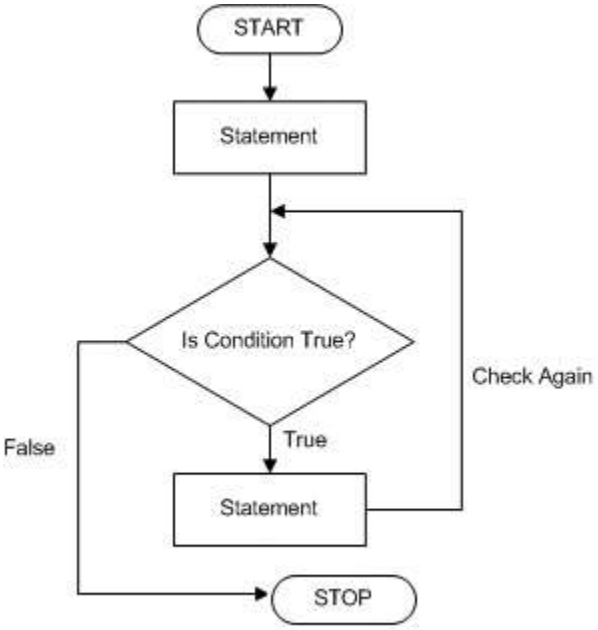
Syntax:

Initialization of control variable

while (condition):

    ……..
    Updation in control variable
    ……

Flowchart



Example: print 1 to 10 numbers

```
num=1      # initialization
while(num<=10):      # condition testing
        print(num, end=" ")
                                    Body of loop
        num + = 1    # Increment
```

Example: Sum of 1 to 10 numbers.

```
num=1
sum=0
while(num<=10):
        sum + = num
        num + = 1
print("The Sum of 1- 10 numbers: ",sum)
```

Example: Enter per day sale amount and find average sale for a week.

Python range( ) Function

The range() function returns a sequence of numbers, starting from 0 by default, and increments by 1 (by default), and ends at a specified number. The common format of range() is as given below:

range (start value, stop value, step value)

Where all 3 parameters are of integer type
Start value is Lower Limit
Stop value is Upper Limit
Step value is Increment / Decrement

Start and Step Parameters are optional default value will be as Start=0 and Step=1

Note: The Lower Limit is included but Upper Limit is not included in result.

Example

range(5) => sequence of 0,1,2,3,4
range(2,5) => sequence of 2,3,4
range(1,10,2) => sequence of 1,3,5,7,9
range(5,0,-1) => sequence of 5,4,3,2,1
range(0,-5) => sequence of [ ] blank list (default Step is +1)
range(0,-5,-1) => sequence of 0, -1, -2, -3, -4
range(-5,0,1) => sequence of -5, -4, -3, -2, -1
range(-5,1,1) => sequence of -5, -4, -3, -2, -1, 0

```
L=list(range(1,20,2)
Print(L)
```

Output: [1, 3, 5, 7, 9, 11, 13, 15, 17, 19]

Python for loop

A for loop is used for iterating over a sequence (that is either a list, a tuple, a string etc.) With for loop we can execute a set of statements, and for loop can also execute once for each element in a list, tuple, set etc.

Example: print 1-10 numbers

```
for num in range(1,11,1):
        print(num, end=" ")
```

Output: 1 2 3 4 5 6 7 8 9 10

Example: print 10-1 numbers

```
for num in range(10,0,-1):
        print(num, end=" ")
```

Output: 10 9 8 7 6 5 4 3 2 1

Print each element in a fruit list:

```
fruits = ["mango", "apple", "grapes", "cherry"]
for x in fruits:
  print(x)
```

output:

```
mango
apple
grapes
cherry
```

```
for x in "TIGER":
  print(x)
```

output:

```
T
I
G
E
R
```

Membership Operators:

The "in" and "not in" are membership operators. These operators check either given value is available in sequence or not. The "in" operator returns Boolean True result if value exist in sequence otherwise returns Boolean False.

The "not in" operator also returns Boolean True / False result but it works opposite to "in" operator.

else in for Loop

The else keyword in for loop specifies a block of code to be executed when the loop is finished:

```
for x in range(4):
  print(x, end=" ")
else:
  print("\nFinally finished!")
```

output: 0 1 2 3
Finally finished!

Nested Loops

A nested loop is a loop inside another loop.

```
city = ["Jaipur", "Delhi", "Mumbai"]
fruits = ["apple", "mango", "cherry"]
for x in city:
  for y in fruits:
    print(x, ":",y)
```

output:

Jaipur : apple
Jaipur : mango
Jaipur : cherry
Delhi : apple
Delhi : mango
Delhi : cherry
Mumbai : apple
Mumbai : mango
Mumbai : cherry

Un- Conditional Control Construct

(pass, break, continue, exit(), quit())

pass Statement (Empty Statement)

The pass statement do nothing, but it used to complete the syntax of programming concept. Pass is useful in the situation where user does not requires any action but syntax requires a statement. The Python compiler encounters pass statement then it do nothing but transfer the control in flow of execution.

```
a=int(input("Enter first Number: "))
b=int(input("Enter Second Number: "))
if(b==0):
   pass
else:
   print("a/b=",a/b)
```

```
for x in [0, 1, 2]:
        pass
```

Jumping Statements

break Statement

The jump- break statement enables to skip over a part of code that used in loop even if the loop condition remains true. It terminates to that loop in which it lies. The execution continues from the statement which find out of loop terminated by break.

```
n=1
while(n<=5):
   print("n=",n)
   k=1
   while(k<=5):
      if(k==3):
         break
      print("k=",k, end=" ")
      k+=1
   n+=1
   print()
```

```
Output:
n= 1
k= 1 k= 2
n= 2
k= 1 k= 2
n= 3
k= 1 k= 2
n= 4
k= 1 k= 2
n= 5
k= 1 k= 2
```

Exit the loop when x is "banana":

```
fruits = ["apple", "banana", "cherry"]
for x in fruits:
    if x == "banana":
        break
    print(x)
```

output: apple

Continue Statement

Continue statement is also a jump statement. With the help of continue statement, some of statements in loop, skipped over and starts the next iteration. It forcefully stop the current iteration and transfer the flow of control at the loop controlling condition.

```
i = 0
while i <=10:
    i+=1
    if (i%2==1):
        continue
    print(I, end=" ")
```

output: 2 4 6 8 10

```
fruits = ["apple", "banana", "cherry"]
for x in fruits:
    if x == "banana":
        continue
    print(x)
```

output:

apple
cherry

Thanks