SNS COLLEGE OF ENGINEERING
Kurumbapalayam (Po), Coimbatore – 641 107
An Autonomous Institution
Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
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DEPARTMENT OF CSE (IoT & CYBER SECURITY INCLUDING BLOCKCHAIN TECHNOLOGY)

19IT103 – COMPUTATIONAL THINKING AND PYTHON PROGRAMMING

- **A readable, dynamic, pleasant, flexible, fast and powerful language**

Recap

- A Boolean expression is an expression that is evaluated as either true or false.
- Two boolean operators are and and or.
- If statement executes its body only when it is true.
- To execute alternative statements when a condition fails, if-else is useful
- If-elif-else is used to check multiple conditions
- Conditionals inside conditional is said to be nested conditional

3.2 Iterations

- Iterations execute a set of instructions repeatedly until some limiting criteria is met.
- Iterations are **performed through 'for' and 'while' loops**.

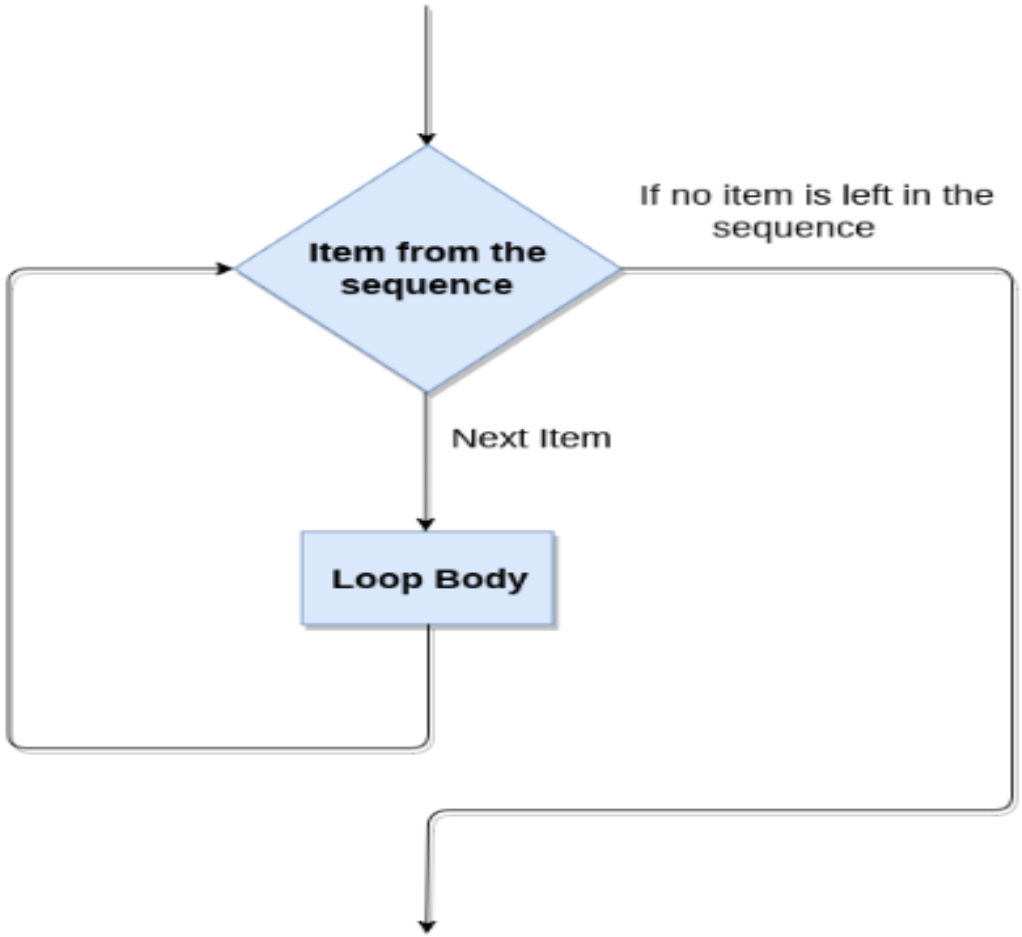
3.2 Iterations

3.2.1 ‘for’ LOOP

- The for loop in Python is used to iterate over a sequence (list, tuple, string) or other iterable objects.
- Iterating over a sequence is called traversal.
- Iteration control variable that takes the value of the item inside the sequence on each iteration.
- Loop continues until we reach the last item in the sequence.
- The body of for loop is separated from the rest of the code using indentation.

3.2 Iterations

The for loop flowchart



3.2 Iterations

3.2.1 'for' LOOP

```
[*]: from time import sleep
     from random import randint

     for _ in range(0,5):
         print('Blah')
         sleep(randint(1,4))
```

```
Blah
```

3.2 Iterations

3.2.1 'for' LOOP

Syntax:

```
for val in sequence:
        Body of for
```

Example 1:

```
#number list
numbers = [6, 5, 3, 8, 4, 2, 5, 4, 11]
sum = 0
for val in numbers:
    sum = sum+val
print("The sum is", sum)
```

Output:

```
The sum is 48
>>>
```

3.2 Iterations

3.2.1 'for' LOOP

Example 2:

```
str = "Python"
for i in str:
    print(i)
```

Output:

```
P
y
t
h
o
n
>>>
```

3.2 Iterations

3.2.1 'for' LOOP using range() function

- The **range()** function is used to generate the sequence of the numbers.
- If we pass the range(10), it will generate the numbers from 0 to 9.

Syntax

```
range(start,stop,step size)
```

- The start represents the beginning of the iteration.
- The stop represents that the loop will iterate till stop-1.
  The **range(1,5)** will generate numbers 1 to 4 iterations. It is optional.
- The step size is used to skip the specific numbers from the iteration. It is optional to use. By default, the step size is 1. It is optional.

3.2 Iterations

3.2.1 ‘for’ LOOP using range() function

Example 3:

```
for i in range(10):
    print(i,end = ' ')
```

Output:

```
0 1 2 3 4 5 6 7 8 9
>>>
```

3.2 Iterations

3.2.1 'for' LOOP using range() function

Example 4:

```
n = int(input("Enter the number "))
for i in range(1,11):
    c = n*i
    print(n,"*",i,"=",c)
```

Output:

```
Enter the number 5
5 * 1 = 5
5 * 2 = 10
5 * 3 = 15
5 * 4 = 20
5 * 5 = 25
5 * 6 = 30
5 * 7 = 35
5 * 8 = 40
5 * 9 = 45
5 * 10 = 50
>>>
```

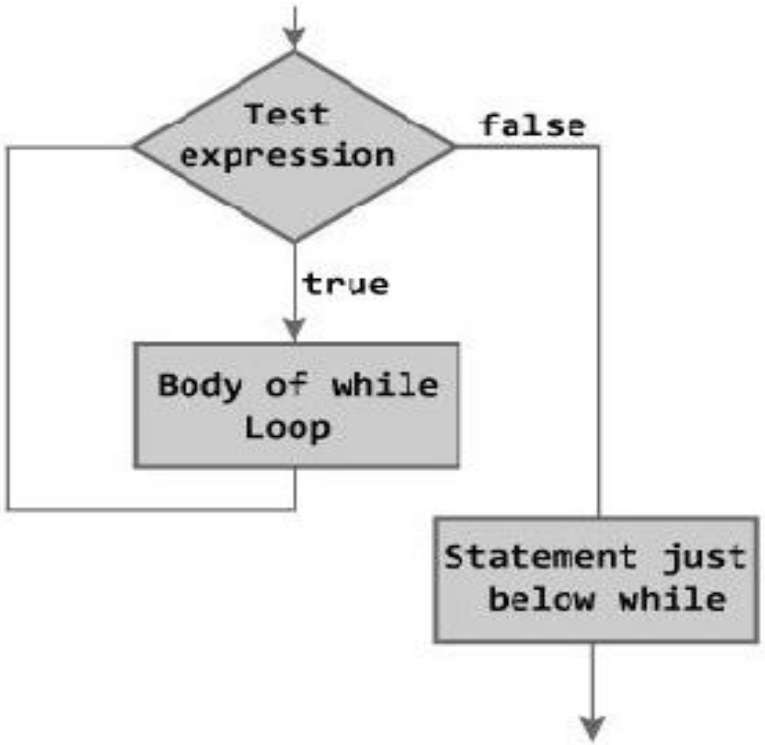
3.2 Iterations

3.2.2 'while' LOOP

- In while loop, test expression is checked first.
- The body of the loop is entered only if the test expression evaluates to True. After one iteration, the test expression is checked again. This process continues until the test_expression evaluates to False.
- In Python, the body of the while loop is determined through indentation.
- Body starts with indentation and the first unintended line marks the end.
- Python interprets any non-zero value as True. None and 0 are interpreted as False.

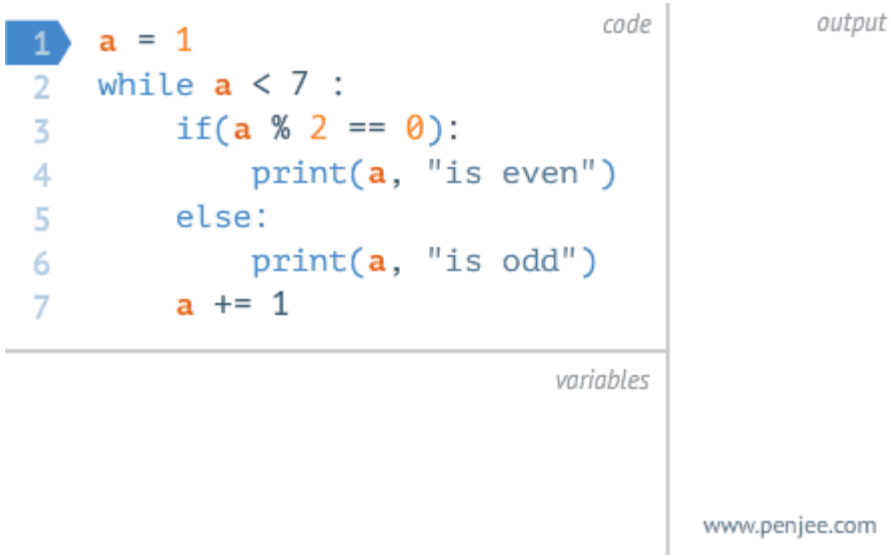
3.2 Iterations

3.2.2 ‘while’ LOOP



3.2 Iterations

3.2.2 'while' LOOP



3.2 Iterations

- **3.2.2 'while' LOOP**

```
1  numbers = [12, 37, 5, 42, 8, 3]
2  even = []
3  odd = []
4  while len(numbers) > 0 :
5      number = numbers.pop()
6      if(number % 2 == 0):
7          even.append(number)
8      else:
9          odd.append(number)
```

3.2 Iterations

3.2.2 'while' LOOP

Syntax

```
while test_expression:
        Body of while
```

Example:

```
n = int(input("Enter a number: "))
sum = 0
i= 1
while i <= n:
    sum = sum + i
    i = i+1
print("The sum is", sum)
```

Output:

```
Enter a number: 10
The sum is 55
>>>
```

3.2 Iterations

3.2.2 ‘while’ LOOP with else

- An optional else block with while loop can also be used.
- The else part is executed if the condition in the while loop evaluates to False.
- The while loop can be terminated with a break statement.

3.2 Iterations

3.2.2 'while' LOOP with else

Example:

```
counter = 0
while counter < 3:
        print("Inside loop")
        counter = counter + 1
else:
        print("Inside else")
```

Output:

```
Inside loop
Inside loop
Inside loop
Inside else
>>>
```

3.2 Iterations

Difference between while and for loop:

while loop	**for loop**
Indefinite loop	Definite loop
The exit condition will be evaluated again and execution resumes from the top(repeatedly executes a set of code)	The for is to iterate over a sequence (List, Tuple and dictionary etc)

3.2 Iterations

3.2.3 State

- State is a behavioral design pattern that allows an object to change the behavior when its internal state changes.
- The pattern extracts state-related behaviors into separate state classes and forces the original object to delegate the work to an instance of these classes, instead of acting on its own.

Summary

- Iterative statements are used for repeated execution
- ‘for’ and ‘while’ are two looping statements used in python
- ‘for loop’ is definite loop whereas ‘while loop’ is indefinite loop
- State is the change in the behaviour of the objects


THANK YOU