

Chapter 7

Loops in python

Sometime we want to repeat a set of statements in our program. For instance :
Print 1 to 1000

Loops make it easy for a programmer to tell the computer, which set of instructions to repeat, and how!

Types of loops in Python

Primarily there are two types of loops in python.

1. While loop
2. For loop

We will look into these one by one!

While loop

The syntax of a while loop looks like this:

while condition:

body of the loop

⇒ The block keeps executing until the condition is true

In while loop the condition is checked first. If it evaluated to true, the body of the loop is executed, otherwise not!

If the loop is entered, the process of [condition check and execution] is continued until the condition becomes False.

Quick Quiz: Write a program to print 1 to 50 using a while loop.

An Example

```
i = 0
while i < 5:
    print("Abhi")
    i = i + 1
```

⇒ prints "Abhi" - 5 times!

Note: If the condition never becomes false, the loop keeps getting executed.

Quick Quiz: Write a program to print the content of a list using while loops.

For loop

A for loop is used to iterate through a sequence like list, tuple or string [Iterables]

The syntax of a for loop looks like this:

```
l = [1, 9, 4]
for item in l:
    print(item)
```

⇒ print 1, 9 & 4

Range function in python

The range function in python is used to generate a sequence of numbers.

We can also specify the start, stop and step-size as follows:

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

↳ step-size is usually not used with `range()`

An example demonstrating `range()` function

```
for i in range(0, 10):
```

→ `range(10)` can also be used
`print(i)`

↳ prints 0 to 9

For loop with else

An optional `else` can be used with a `for` loop if the code is to be executed when the loop exhausts.

example:

```
n = [1, 7, 8]
```

```
for item in n:
```

```
    print(item)
```

```
else:
```

```
    print("Done")
```

→ This is printed when the loop exhausts!

Output :

1

7

8

Done

The break statement

'break' is used to come out of the loop when encountered it instructs the program to - exit the loop now.

Example:

```
for i in range(0,80):
```

```
    print(i)
```

→ This will print 0, 1, 2 and 3

```
    if i == 3:
```

```
        break
```

The continue statement

'continue' is used to stop the current iteration of the loop and continue with the next one. It instructs the program to "skip this iteration".

example:

```
for i in range(4):
```

```
    print("printing")
```

```
    if i == 2:
```

```
        continue
```

```
    print(i)
```

⇒ if i is 2, the iteration is skipped.

Pass statement

pass is a null statement in python. It instructs to "Do nothing".

Example:

```
l = [1, 9, 8]
```

```
for item in l:
```

```
    pass
```

→ without pass, the program will throw an error!

Chapter - 7

Practice Set

Que 1. Write a program to print multiplication table of a given number using for loop.

Que 2. Write a program to greet all the person names stored in a list ls and which starts with A

ls = ["Abhi", "Manisha", "Amit", "Akansha"]

Que 3. Attempt problem 1 using while loop.

Que 4. Write a program to find whether a given number is prime or not.

Que 5. Write a program to find the sum of first n natural numbers using while loop.

Que 6. Write a program to calculate the factorial of a given number using for loop.

Que 7. Write a program to print the following star pattern

```
  *
 * * *
* * * * *
```

for n = 3

Que 8. Write a program to print the following star pattern:

*

* *

* * *

for $n=3$

Que 9. Write a program to print the following star pattern

* * *

* * *

* * *

for $n=3$

Que 10. Write a program to print multiplication table of n number using for loop in reversed order.