

6 Loops

In python there are 2 types of loops, for loop and while loop. The for loop is used to iterate over a sequence (list, tuple, string) or other iterable objects. The while loop is used to iterate over a block of code as long as the test expression (condition) is true.

6.1 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.

6.1.1 Syntax

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

Usually we will use the for loop with the range() function to iterate over a sequence of numbers. 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.

Example

```
1 # This program prints all the numbers from 0 to 10
2 for i in range(11): # It only includes the ending parameter
3     print(i)
```

If we want to print the numbers from 1 to 10, we can use the range() function with the starting and ending parameters.

Example

```
1 # This program prints all the numbers from 1 to 10
2 for i in range(1,11): # The starting parameter is 1 and the ending parameter is
3     print(i)
```

If we want to print the numbers from 1 to 10 with a step of 2, we can use the range() function with the starting, ending and step parameters.

Example

```
1 # This program prints all the numbers from 1 to 10 with a step of 2
2 for i in range(1,11,2): # The step is 2
3     print(i)
```

We can also use the range() function with a negative step to print the numbers in reverse order.

Example

```
1 # This program prints all the numbers from 10 to 1
2 for i in range(10,0,-1): # The step is -1
3     print(i)
```

Usually we use for loop when we know the number of times to iterate. But sometimes we don't know the number of times to iterate, in such cases we use while loop.

6.2 While Loop

The while loop in Python is used to iterate over a block of code as long as the test expression (condition) is true.

6.2.1 Syntax

```
1 while test_expression:
2     Body of while
```

Example

```
1 # This program prints all the numbers from 0 to 10
2 i = 0 # First we set the variable i to 0
3 while i < 11: # Then we check if i is less than 11
4     print(i) # If it is, we print i
5     i += 1 # Then we add 1 to i
```

6.3 Break and Continue

6.3.1 Break

The break statement is used to exit or terminate a loop.

Example

```
1 # This program prints all the numbers from 0 to 5
2 i = 0 # First we set the variable i to 0
3 while i < 11: # Then we check if i is less than 11
4     print(i) # If it is, we print i
5     if i == 5: # If i is equal to 5
6         break # We break the loop
7     i += 1 # Then we add 1 to i
```

6.3.2 Continue

The continue statement is used to skip the rest of the code inside a loop for the current iteration only. Loop does not terminate but continues on with the next iteration.

Example

```
1 # This program prints all the numbers from 0 to 10 except 5
2 i = 0 # First we set the variable i to 0
3 while i < 11: # Then we check if i is less than 11
4     i += 1 # Then we add 1 to i
5     if i == 5: # If i is equal to 5
6         continue # We continue to the next iteration
7     print(i) # If i is not equal to 5, we print i
```