Nested While

While loop inside while loop is called nested while.

Syntax:

```
while <condition>:    → Outer loop
  while <condition>:  → Inner loop
     statement-1
     statement-2
  statement-3
```

Example

```
num=1
while num<=10:
   i=1
   while i<=10:
      print(num*i,end='  ')
      i=i+1

   num=num+1
   print()
```

Output

```
1  2  3  4  5  6  7  8  9  10
2  4  6  8  10  12  14  16  18  20
3  6  9  12  15  18  21  24  27  30
4  8  12  16  20  24  28  32  36  40
5  10  15  20  25  30  35  40  45  50
6  12  18  24  30  36  42  48  54  60
7  14  21  28  35  42  49  56  63  70
8  16  24  32  40  48  56  64  72  80
9  18  27  36  45  54  63  72  81  90
10  20  30  40  50  60  70  80  90  100
```

Example

```
# write a program generate armstrong numbers from 100-999

num=100
while num<=999:  # Generating numbers from 100 to 999
   num1=num
```

```
    s=0
    while num1>0:
        r=num1%10
        s=s+(r**3)
        num1=num1//10

    if num==s:
        print(num)

    num=num+1
```

Output

```
153
370
371
407
```

Branching statements

Branching statements are used to control the execution of while and for loop.

Python support 3 branching statements

1. Break
2. Continue
3. Return (function)

Break statement

"break" is a keyword.

This keyword is used inside while or for loop.

This statement is used to terminate execution of while or for loop unconditionally or in between.

Example:

```
while True:
    print("Hello")
    break
```

```
for i in range(10):
    print("Python")
    break
```

Output

```
Hello
Python
```

```
# Login Application

while True:
    user=input("UserName :")
    pwd=input("Password :")
    if user=="nit" and pwd=="nit123":
        print("Welcome")
        break
    else:
        print("invalid username or password try again...")
```

Output

```
UserName :nit
Password :abc
invalid username or password try again...
UserName :abc
Password :nit123
invalid username or password try again...
UserName :nit
Password :nit123
Welcome
```

```
import random
while True:
    num=int(input("Enter any number(1-5)"))
    g_num=random.randint(1,5)
    if num==g_num:
        print("Correct")
        break
    else:
        print("Wrong")
```

Output

```
Enter any number(1-5)1
Wrong
Enter any number(1-5)3
Wrong
Enter any number(1-5)2
Correct
```

Example:

Write a program to print sum of first 10 numbers which are divisible with 5

```
num=5
s=0
c=0
while True:
    if num%5==0:
        print(f'{num}')
        s=s+num
        c=c+1

    num=num+1
    if c==10:
        break

print(f'Sum {s}')
```

Output

```
5
10
15
20
25
30
35
40
45
50
```

Sum 275

Example:

```
for i in range(10):
    print(i)
    if i==5:
        break
```

Output

```
0
1
2
3
4
5
```

Example

```
# Write a program to find input number is prime or not

num=int(input("Enter any number "))
c=0
for i in range(1,num+1):
    if num%i==0:
        c=c+1
    if c>2:
        break

if c==2:
    print(f'{num} is prime')
else:
    print(f'{num} is not prime')
```

Output

```
Enter any number 4
4 is not prime

Enter any number 5
5 is prime
```

Continue

"continue" is a keyword

"continue" keyword is used inside while or for loop.

This statement continues the execution of for or while loop.

Syntax:

```
while <condition>:
    statement-1
     continue
```

Syntax:

```
for variable in iterable:
   statement-1
   continue
```

Example:
 	
for i in range(1,6):
  print("Python")
  continue
  print("Django")
	Output
	Python
	Python
	Python
	Python
	Python

Example
for num in range(1,11):
  if num%2==0:
  continue
  print(num)
	Output
	1
	3
	5
	7
	9

Example
for n in range(1,11):
  if n<=5:
  print(n)
  continue
  break
	Output
	1
	2
	3
	4
	5

while..else (OR) for ..else

Syntax: while <condition>:	**Syntax:** for variable in iterable:

statement-1 statement-2 else: statement-3 statement-4	statement-1 statement-2 else: statement-3 statement-4

Example
# Write a program to find factorial of a number 	
 	
num=int(input("Enter any number "))
fact=1
 	
for i in range(1,num+1):
fact=fact*i
else:
print(f'factorial is {fact}')
	Output
	Enter any number 3
	factorial is 6

Example
i=1
while i<=5:
print("inside while block")
i=i+1
 	
else:
print("inside else block")
	Output
	inside while block
	inside while block
	inside while block
	inside while block
	inside while block
	inside else block

"else" block is not executed if while or for loop is terminated in between using "break" statement.

i=1
while i<=5:
print("inside while block")
i=i+1
break
else:
print("inside else block")
	Output
	inside while block

Collection Data types