Loops

1) For loop

A for loop is used when you know the exact number of times you want to repeat a block of code. It goes through a sequence (like numbers, lists, strings, etc.).

Syntax :-

- For loop with sequence :-

```
for var in sequence_name :
    Statements
```

- For loop with range :-

```
for var in range (start value, stop value, step) :
    Statement
```

Eg.:-
```
for i in range (1,6):
    print (i)
```

output

1
2
3
4
5

2) While loop

A while loop is used, when you don't know how many times you need to repeat. It runs as long as the condition is true.

Syntax:

```
initialization
while (condition):
        statements
        inc/Dec
```

Eg:-

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

output
```
1
2
3
4
5
```

3) Nested loop

A nested loop means a loop inside another loop used when you need rows & columns (like patterns, tables, matrices)

a) For loop inside for loop

Syntax:

```
    for var_a in range ():
        for var_b in range ():
            Statements of inner loop
        Statement of outer loop
```

Eg:-
```
For i in range (,4):
    for j in range (1,4):
        print (i,j)
```

output
```
1   1
1   2
1   3
2   1
2   2
2   3
3   1
3   2
3   2
```

b) While loop inside while loop

```
initialization of outer loop
while (condition of outer loop):
        initialization of inner loop
        while (condition of inner loop):
            Statements of inner loop
            inc/dec of inner loop
        Statements of outer loop
        inc/dec of outer loop
```