## 2) while loop inside while loop

A nested while loop means having one while loop placed inside the body of another while loop. The outer loop controls how many times the inner loop will execute completely.

## Syntax:

initialization of outer while

while(condition):                          # outer while

   initialization of inner while

   while(condition):                     #inner while

     statements of inner while

     incrementation/decrementation of inner while

   statements of outer while

   incrementation/decrementation of outer while


example 1:

i=1

while(i<=10):

  j=1

  while(j<=10):

    print(i*j,end='\t')

    j=j+1

  print()

  i=i+1

o/p:

| 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 2:

```
i=1

while(i<=5):

    j=1

    while(j<=5):

        print(i,end=' ')

        j=j+1

    print()

    i=i+1
```

o/p:

1 1 1 1 1

2 2 2 2 2

3 3 3 3 3

4 4 4 4 4

5 5 5 5 5

example 3:

i=1

while(i<=5):

  j=1

  while(j<=5):

    print(j,end=' ')

    j=j+1

  print()

  i=i+1

o/p:

1 2 3 4 5

1 2 3 4 5

1 2 3 4 5

1 2 3 4 5

1 2 3 4 5

# Pattern Programs:

Expected output:

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

Using for loop inside for loop:

```python
for i in range(0,5,1):
    for j in range(0,i+1,1):
        print('*',end=" ")
    print()
```

Using while loop inside while loop:

```python
i=1
while(i<=5):
    j=1
    while(j<=i):
        print('*',end=' ')
        j=j+1
    print()
    i=i+1
```

Expected output:

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

Using for loop inside for loop:

```
for i in range(1,6,1):
    for j in range(5,i-1,-1):
        print('*',end=" ")
    print()
```

Using while loop inside while loop:

```
i=1
while(i<=5):
    j=5
    while(j>=i):
        print('*',end=' ')
        j=j-1
    print()
    i=i+1
```