Loops

- Function: Reuse of the code
- Loop: Reuse the code for multiple times unless the given conditions satiesfies
  - For
  - While
- Any loop requires 3 things
  - start point
  - what is the condition to stop
  - Increment or decrement
- in for loop we will apply all above 3 in a single line
- in while loop we will apply all above 3 in 3 different lines

For loop

$method - 1$

In [ ]:
```
# syntax
for i in range(<stop>):
    print(i)
```

In [1]:
```
print(0)
print(1)
print(2)

print(i)
```

```
0
1
2
```

In [2]:
```
for i in range(3):
    print(i)
```

```
0
1
2
```

Note: range(stop)

- The default start point is zero

  Python index starts with zero

- Default increment is 1
- Last value= stop-1

range(5)

- start value=0
- increment=1
- Last value= 5-1=4

In [3]:
```
for i in range(5):
    print(i)
```

```
0
1
2
3
4
```

In [8]:
```
print(0,end=' ')
print(1,end=' ')
print(2)
```

```
0 1 2
```

In [9]:
```
for i in range(5):
    print(i,end=' ')
```

```
0 1 2 3 4
```

In [11]:
```
# I want to print 3 times hello
for i in range(5):
    print(i,'hello')
```

```
0 hello
1 hello
2 hello
3 hello
4 hello
```

$method - 2$

range(start,stop)

- start value = start
- Default incremnt by 1
- Last value= stop-1

In [ ]:
```
# syntax
for i in range(<start>,<stop>):
    print(i)
```

In [12]:
```
for i in range(2,10):
    print(i,end=' ')

# start=2   increment =1   last =10-1=9
```

```
2 3 4 5 6 7 8 9
```

In [13]:
```python
# WAP ask the user print the square of the numbers from 1 to 5
for i in range(1,6):
    print(f"the square of {i} is {i*i}")
```

```
the square of 1 is 1
the square of 2 is 4
the square of 3 is 9
the square of 4 is 16
the square of 5 is 25
```

In [15]:
```python
# WAP ask the user take 5 random numbers between 10 to 100
# and print the square of the random numbers
# how many times you need to apply the loop : 5
# Every time random number should come
# get the square

import random
num=random.randint(1,100)
print(f"the square of {num} is {num*num}")

import random
num=random.randint(1,100)
print(f"the square of {num} is {num*num}")

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import random
num=random.randint(1,100)
print(f"the square of {num} is {num*num}")
```

```
the square of 78 is 6084
the square of 30 is 900
the square of 63 is 3969
the square of 43 is 1849
the square of 23 is 529
```

In [16]:
```python
import random
for i in range(5):
    num=random.randint(1,100)
    print(f"the square of {num} is {num*num}")
```

```
the square of 86 is 7396
the square of 99 is 9801
the square of 26 is 676
the square of 34 is 1156
the square of 19 is 361
```

In [17]:
```python
# Create a function on reuse code lines
# call that function inside the for loop
def square():
    num=random.randint(1,100)
    print(f"the square of {num} is {num*num}")
```

```
for i in range(5):
    square()
```

```
the square of 4 is 16
the square of 5 is 25
the square of 54 is 2916
the square of 64 is 4096
the square of 66 is 4356
```

In [18]:
```
def square():
    num=random.randint(1,100)
    return(f"the square of {num} is {num*num}")

for i in range(5):
    ans=square()
    print(ans)
```

```
the square of 52 is 2704
the square of 36 is 1296
the square of 21 is 441
the square of 96 is 9216
the square of 13 is 169
```

In [19]:
```
import random
def square1():
    for i in range(5):
        num=random.randint(1,100)
        print(f"the square of {num} is {num*num}")

square1()
```

```
the square of 29 is 841
the square of 38 is 1444
the square of 88 is 7744
the square of 60 is 3600
the square of 20 is 400
```

In [ ]:
```
def add():
    a=10
    b=20
    print(a+b)

for i in range(5):
    ans=add()
    print(ans)
```

In [ ]:
```
import random
def square1 ():
    for i in range (0,5) :
        num=random.randint(100,1000)
        print(f"The square of {num} is {num*num}")

square1()
```

In [20]:
```
# wap ask the user print the even or odd values between 11 to 21
for i in range(11,22):
    if i%2==0:
        print(f'{i} is an even number')
    else:
        print(f'{i} is an odd number')
```

```
11 is an odd number
12 is an even number
13 is an odd number
14 is an even number
15 is an odd number
16 is an even number
17 is an odd number
18 is an even number
19 is an odd number
20 is an even number
21 is an odd number
```

In [21]:
```python
# wap ask the user enter a value from keyboard 5 times
# print that value is even or odd
for i in range(5):
    num=eval(input("enter the number:"))
    if num%2==0:
        print(f'{num} is an even number')
    else:
        print(f'{num} is an odd number')
```

```
4 is an even number
7 is an odd number
8 is an even number
9 is an odd number
2 is an even number
```

In [ ]:
```python
# WAP ask the user print the square of the numbers from 1 to 5

# WAP ask the user take 5 random numbers between 10 to 100
# and print the square of the random numbers

# Create a function on reuse code lines
# call that function inside the for loop

# wap ask the user print the even or odd values between 11 to 21

# wap ask the user enter a value from keyboard 5 times
# print that value is even or odd
```

$method-3$

range(start,stop,step)

- start= always a start value
- step: Increment value
  - If increment value is postive
  - positive value means postive directions(Forward)
    - Last= stop-1
  - If increment value is negative
  - negative value means negative directions(Backward)
    - Last =stop+1

In [22]:
```
#case-1
for i in range(2,20,2):
    print(i,end=' ')

# start=2
# step=2  +ve direction
# last=stop-1=20-1=19

# First write start value and stop value
# Then look at direction postive or negative
# then make the conclusion
```

```
2 4 6 8 10 12 14 16 18
```

In [23]:
```
#case-2
for i in range(2,20,-2):
    print(i,end=' ')

# start=2
# step=2  negative direction
# Last= stop+1: 20+1=21
```

In [24]:
```
#case-3
for i in range(2,-20,-2):
    print(i,end=' ')

# start=2
# step=2  negative
# last= stop+1= -20+1=-19
```

```
2 0 -2 -4 -6 -8 -10 -12 -14 -16 -18
```

In [25]:
```
#case-4
for i in range(-2,-20,-2):
    print(i,end=' ')

# start=-2
# step=2  negative
# Last= stop+1= -20+1=-19
```

```
-2 -4 -6 -8 -10 -12 -14 -16 -18
```

In [26]:
```
#case-5
for i in range(-2,20,-2):
    print(i,end=' ')

# start=-2
# step=2  negative
# Last= 20+1=21
```

In [ ]:
```
#case-1
for i in range(2,20,2):
    print(i,end=' ')

#case-2
for i in range(2,20,-2):
    print(i,end=' ')

#case-3
for i in range(2,-20,-2):
```

```
    print(i,end=' ')

#case-4
for i in range(-2,-20,-2):
    print(i,end=' ')

#case-5
for i in range(-2,20,-2):
    print(i,end=' ')
```

In [ ]:
```
1)range(3,19,3)  # p
2)range(3,19,-3) # NP
3)range(3,-19,3) # NP
4)range(3,-19,-3) # P
5)range(-3,19,3) # P
6)range(-3,-19,3) #NP
7)range(-3,-19,-3) #P
8)range(-3,19,-3) # NP
9)range(19,3,-3) # P
10)range(-19,3,-3) # NP
11)range(-19,-3,-3) #Np
12)range(-19,3,3) # p
13)range(19,3,3)# NP
```

In [ ]:
```
range(19,3,-3)

# s=19
# last =
```