Loops

- For loop
- while loop : If you want to run an infinite iterations will choose while loop
- Every loop we need three things
  - Intial point (starting point)
  - Increment or decrement
  - Condition (stop point)

In [2]:
```
for i in range(1,10,2):
    print(i,end=' ')
```

```
1 3 5 7 9
```

- In for loop all three things mentioned in a single line : range(start,stop,step)
- In while loop we will use these three things, in as a three lines

In [ ]:
```
<start point>
while  <how to stop>:
     codeline1
     codeline2
     <increment or decrement>
```

In [ ]:
```
if <condition>:
    ######
```

In [3]:
```
for i in range(1,10):
    print(i,end=' ')
    print('hello')
```

```
1 2 3 4 5 6 7 8 9
```

In [ ]:
```
# start point  i=1
# while <condition to stop>:
#        i=i+1
```

In [ ]:
```
i=1
while <condition to stop>:
    print(i,end=' ')
    i=i+1

# Conditions  i<11   1<11  True
#             i<2   1<2    True
#             i>10  1>10   False
#             i<15
```

In [ ]:
```
- range(1,10): start=1  last=10-1 =9 step= 1
```

```
i=1
while <condition>:
    print(i)
    i=i+1

- correct entry  and correct exit

- True condition  i<5 True
```

In [6]:
```
i=1
while i<11:
    print(i,end=' ')
    i=i+1

# step-1:  i=1   while 1<2  True  print(1)   i=1+1  i=2
# step-2:  i=2   while 2<2  False
```

```
1 2 3 4 5 6 7 8 9 10
```

In [7]:
```
i=1
while i==10:
    print(i,end=' ')
    i=i+1

# step-1:  i=1   while 1==10  False
```

In [ ]:
```
i=1
while i<11:
    print(i,end=' ')
    i=i-1

# step-1:  i=1   while 1<11  True  print(1)   i=1-1  i=0
# step-2: i=0   while 0<11   True  print(0)   i=0-1  i= -1
# step-3:  i=-1  while -1<11  True  print(-1) i=-1-1  i=-2

# 1,0,-1,-2,.............
```

In [ ]:
```
i=1
while i<11:
    print(i,end=' ')
    i=i+1
########################################################################
i=1
while i==10:
    print(i,end=' ')
    i=i+1

########################################################################
i=1
while i<11:
    print(i,end=' ')
    i=i-1
```

In [8]:
```
i=1
while i<11:
    print(i,end=' ')
    i=i-1
    if i==-10:
        break
```

```
1 0 -1 -2 -3 -4 -5 -6 -7 -8 -9
```

In [9]:
```
# 20 to 1
# -20 to 0

i=20
while i>0:
    print(i,end=' ')
    i=i-1
```

```
20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
```

In [10]:
```
i=-20
while i<1:
    print(i,end=' ')
    i=i+1
```

```
-20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0
```

True

- if you dont know about valid condition to enter inside while loop
- Then use **True**
- True will give entry pass irrespective of the condition
- But if you want to come out we need apply if condition and break inside the while loop
- If you dont apply the break inside, then it becomes infinite loop

In [ ]:
```
i=1
while i<11:
    print(i,end=' ')
    i=i+1


i=1
while True:
    print(i,end=' ')
    i=i-1
    if i==-10:
        break


i=20
while i>0:
    print(i,end=' ')
    i=i-1

i=-20
while i<1:
    print(i,end=' ')
    i=i+1
```

In [13]:
```
i=1
while i<11:
    print(i,end=' ')
```

```
    i=i+1

print('========= second method==========')
i=1
while True:
    print(i,end=' ')
    i=i+1
    if i==11:
        break
```

```
1 2 3 4 5 6 7 8 9 10 ========= second method==========
1 2 3 4 5 6 7 8 9 10
```

In [ ]:
```
i=1
while True:
    print(i,end=' ')
    i=i-1
    if i==-10:
        break
```

In [14]:
```
i=20
while i>0:
    print(i,end=' ')
    i=i-1

print("========== second")
i=20
while True:
    print(i,end=' ')
    i=i-1
    if i==0:
        break
```

```
20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 ========== second
20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
```

In [15]:
```
i=-20
while i<1:
    print(i,end=' ')
    i=i+1
print("========== second")
i=-20
while True:
    print(i,end=' ')
    i=i+1
    if i==1:
        break
```

```
-20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 ========
=== second
-20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0
```

In [16]:
```
i=-20
while i<1:
    print(i,end=' ')
    i=i+1

print("========== second")

i=-20
while i<1:
```

```
    i=i+1
    print(i,end=' ')
```

```
-20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 ========
=== second
-19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1
```

In [17]:
```
import random
num=random.randint(1,100)
for i in range(3):
    if num%2==0:
        print(f'{num} is even')
    else:
        print(f'{num} is odd')

# step-1: Importing
# step-2: num= random number : 25
# step-3: loop 3 times
# step-4:    25%2==0
```

```
24 is even
24 is even
24 is even
```

In [18]:
```
import random
for i in range(3):
    num=random.randint(1,100)
    if num%2==0:
        print(f'{num} is even')
    else:
        print(f'{num} is odd')
```

```
21 is odd
72 is even
27 is odd
```

In [ ]:
```
########## ALL For loop need to conver into while =============
kindly complete all questions , we will do same replica in While loop
#1Q) For example
# take a random number between  1 to 100
# print it is a even number and odd number
# you need to generate 3 random number

#2Q) wap ask the user print the number is even or odd between 10 to 20

#3Q) wap ask the user print the square of the number between
# 20 to 25

#4Q) WAP ask the user enter number three times find the square of the number
# How many times loop should run


#5Q) Print the 14th table
# ans:   14 x 1 = 14
#        14 x 2 = 28
#        14 x 3 = 42
#
#
#        14 x10 = 140
# How many times 10
```

```
#6 Q) Find the factors of 75
# step-1: Iterate the loop = which numbers factor you want
# step-2: Apply the if condition
#         cond= divide the number with each i


#7Q) Write the sum of first 10 Natural numbers
# 1 to 10
# 1+2+3+4+5+6+7+8+9+10=55


# 8Q) Average first 1 to 10 numbers
# avg= summation of all the numbers/total number
#Wap to find the average of ' N ' numbers in Python.


#9Q) Find the number of divisors of 75
# ans: 1,3,5,15,25,75
# Number =6



# 10Q)
# Get a random number between  1 to 10 :  num1
# Ask the user enter a number : num2
# if num1 == num2  then print won
# else print fail

# Give 3 chances

# Case-2: whenever you won the code should stop

# Case-3:
# Suppose i want to give 4 chances
# Every time you fail I want to display
#      Number of chances left

# If all the chances you are used
#    Try again after 24 hours

# If you are win




11q)# wap ask the user get 5 random numbers
# Get it is an even number or odd number
# also count how many even numbers are there
# and  count how many odd numbers are there

# Idea
# take two counters one even and odd count
# For loop 5 times
# each time take the random number
# If condition
#    True counter update
# else
#   Update the counter
```

```
12Q) # wap ask the user get 5 random numbers
# Get it is an even number or odd number
# also count how many even numbers are there
# and  count how many odd numbers are there
# I want summ even numbers
# I want summ odd numbers
```

In [ ]:
```
#1Q) For example
# take a random number between  1 to 100
# print it is a even number and odd number
# you need to generate 3 random number

import random
for i in range(3):
    num=random.randint(1,100)
    if num%2==0:
        print(f'{num} is even')
    else:
        print(f'{num} is odd')
```

In [26]:
```
#range(3) ===== three lines
i=333
while i<336:
    num=random.randint(1,100)
    if num%2==0:
        print(f'{num} is even')
    else:
        print(f'{num} is odd')
    i=i+1
```

```
86 is even
94 is even
40 is even
```

In [23]:
```
# A  ===== 65
# B  ===== 66
# C  ===== 67

# ASCII

ord('A'),ord('B')
```

Out[23]:
```
(65, 66)
```

In [24]:
```
chr(65)
```

Out[24]:
```
'A'
```

In [ ]:
```
#6Q
i=1
num=eval(input("Enter the number of which you want factors:"))
while i<num+1:
    if num%i==0:
        print(f"Factor of number is {i} ")
    i=i+1

factor=eval(input('enter the factor number'))
i=1
```

```
while i<factor+1:
    i=i+1
```