range data type

range is an immutable sequence data type. This data type is used to generate sequence of integer values in increment order or decrement order.

In application development range data type is used,

1. To repeat for loop number of times
2. To generate values for other collections.

The range type represents an immutable sequence of numbers and is commonly used for looping a specific number of times in for loops.

Syntax1: range(stop)
Syntax2: range(start,stop,step)

Range data type is having 3 attributes/inputs

1. Start
2. Stop
3. Step

Start: Define starting value of the range (included)
Stop: Define ending value of the range (excluded)
Step: **define difference between values within range (default 1)**

All these values must be integer type
Step should not be zero

Syntax1: range(stop)

This syntax allows inputting stop value.

The default start value is 0
The default step value is 1

Range is created with 3 values

1. Start=0
2. Step=1
3. Stop=the value given by programmer

Example:

```
r1=range(5)  # start=0,stop=5,step=1

for x in r1:
    print(x)
```

Output

```
0
1
2
3
4
```

This syntax allows generating sequence of +ve integer values
This syntax always generate values in increment order

Always range generates values based on step value (OR) always starts and stop values are given based step value

Step is +ve, start<stop
Step is –ve, start>stop

Example:

```
r1=range(-5) # start=0,stop=-5,step=1
```

```
for x in r1:
    print(x)
```

Output
No Output

Syntax1 is useful for generating indexes in order to read values from sequences.

Syntax-2: range(start,stop,[step])
In this syntax default step value is 1
This syntax allows generating values in increment order or decrement order.
This syntax allows generating +ve and 0ve sequence of integer values.

Example:

```
r1=range(1,6,1) # start=1,stop=6,step=1
for x in r1:
    print(x,end=' ')

print()
for y in range(5,0,-1): # start=5,stop=0,step=-1
    print(y,end=' ')

print()
for z in range(-1,-6,-1): # start=-1,stop=-6,step=-1
    print(z,end=' ')

print()
for k in range(-5,0,1): # start=-5,stop=0,step=1
```

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

print()
for n in range(2,21,2): # start=2,stop=21,step=2
    print(n,end=' ')

print()
for n in range(1,21,2): # start=1,stop=21,step=2
    print(n,end=' ')

print()
for n in range(-5,6,1): # start=-5,stop=6,step=1
    print(n,end=' ')

print()
for n in range(5,-6,-1): # start=5,stop=-6,step=-1
    print(n,end=' ')
```

Output

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

Example:

```
# write a program to generate sqr's integers range from
# 1 to 10
```

```
for num in range(1,11):
    print(f'{num}-->{num**2}')
```

Output

```
1-->1
2-->4
3-->9
4-->16
5-->25
6-->36
7-->49
8-->64
9-->81
10-->100
```

Example:

```
# Write a progam to generate a math table
# of input number

num=int(input("Enter any number "))
for i in range(1,11):
    p=num*i
    print(f'{num}x{i}={p}')
```

Output

```
Enter any number 6
6x1=6
```

6x2=12
6x3=18
6x4=24
6x5=30
6x6=36
6x7=42
6x8=48
6x9=54
6x10=60

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:
    print(f'{num} is prime')
else:
    print(f'{num} is not prime')
```

Output

Enter any number 5
5 is prime

Enter any number 7
7 is prime

Enter any number 9
9 is not prime

Example:

```
# Write a program to find factorial of input number

num=int(input("Enter any number "))
fact=1
for i in range(1,num+1):
    fact=fact*i

print(f'Factorial is {fact}')
```

Output

Enter any number 4
Factorial is 24

Example:

```
# Write a program to print sum of sqr's all the numbers
# from 1 to 10

s=0
for num in range(1,11):
    s=s+(num**2)
    print(num**2)

print(f'sum is {s}')
```

Output

1
4

9
16
25
36
49
64
81
100
sum is 385

Example:

```
# Write a program to print the sum of the following
# series


n=int(input("input n value "))

s=0
for num in range(1,n+1):
    s=s+(num**num)
    print(num**num)

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

Output

input n value 5
1
4
27
256
3125
Sum is 3413

Example:

```
# Write a program to generate sum of the following series

# 2-3+4-5+6-7+8-9+10

s=0
for num in range(2,11):
    if num%2==0:
        s=s+num
    else:
        s=s-num

print(s)
```

Output

```
6
```

Example:

```
# Write a program to genrate alphabets from A-Z

for n in range(65,91):
    print(chr(n),end=' ')

print()
# Write  a program to gernate alphabets froma a-z
for n in range(97,123):
    print(chr(n),end=' ')
```

Output

```
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
```