The Loops in Python

What is the purpose of loops in Python?

Loops are used when you need to repeat a block of code multiple times without writing the same instructions again and again.

In many situations, we want to perform a repetitive task, such as displaying numbers from 1 to 100. Writing 100 separate print() statements would be inefficient and impractical. A loop allows Python to do this automatically and efficiently.

Without a loop:

```
print(1)
print(2)
print(3)
# ... up to 100
```

I – The for Loop

The for loop is used to iterate over a sequence (numbers, characters, etc.).

1-The range() function

range() is a built-in Python function used to generate a sequence of numbers. It takes three forms

Example 1

Write a Python program that displays the numbers from 1 to 10.

1-1 range(stop)

Starts from 0

Ends at stop − 1

```
for i in range(11):
    print(i)
```

1-2 range(start, stop)

Starts from start

Ends at stop − 1

```
for i in range(1,11):
    print(i)
```

1-3 range(start, stop, step)

The step controls how much the number increases each time.

```
for i in range(1,11,1):
    print(i)
```

Example 2

Write a Python program that reads a number, then prints all even numbers less than that number.

```
Num=int(input('enter an integer'))

for i in range(0,Num,2):
    if i%2==0:
        print(i)

Num=int(input('enter an integer'))

for i in range(0,Num,2):
    print(i)
```

Example 3

Write a Python program that prints each character in a string entered by the user.

Solution 1

```
Text=input('enter a text')
for ch in Text:
    print(ch)
```

Solution 2

```
Text=input('enter a text')
for i in range(len(Text)):
    print(Text[i])
```

II – The while Loop

The while loop repeats a block of code as long as a condition is true.

```
while condition:
    # code to repeat if    condition is true
```

Example 4

Write a Python program that asks the user to enter a positive integer. Then display all numbers from that integer down to 0.

```
Num=int(input('enter an integer positive'))
for i in range(Num,-1,-1):
    print(i)
print('==========')
i=Num
while i>=0:
    print(i)
    i-=1
```