Loops

Loops in python are used to execute a block of code repeatedly until a certain condition in met.

Python mainly provides two types of loops

1) For loop
2) While loop
3) Nested loop:
    - For loop inside for loop
    - For loop inside while loop
    - While loop inside while loop
    - While loop inside for loop

For loop with sequence : string , list, tuple, set,dict

For loop with range

Examples:

1.Name= “Priyanka”

Print(Name)

Ans: Priyanka

2. for i in name:

    Print(i)

Note: i is ittirative variable

Ans:

```
p
r
i
y
a
n
k
a
```

Enumerate: To name things separately, one by one, or to count off elements, usually in a list.

Example1:

For i in enumerate(name):

    Print(i)

Ans:

```
(0, 'p')
(1, 'r')
(2, 'i')
(3, 'y')
(4, 'a')
(5, 'n')
(6, 'k')
(7, 'a')
```

Example1:

Fruit = [‘apple’,’mango’,’grapes’,’pineapple’]

Print(fruit)

Output: [‘apple’,’mango’,’grapes’,’pineapple’]

Example2:

For i in fruit:

    Print(i)

Note: i is ittirative variable

Output:

    Apple

    Mango

    Grapes

    Pineapple

Initialization:

Syntax:

Condition

Incrementation/decrementation

Range(start value,stop value,step size)

Example1:

```
For i in range(1,11,1):
        Print(i)
```

Definition:

I= I is ittirative variable

Range= 1,11,1

1 = Start value

11 = stop value. last number of the stop values never displayed.

For exp: 11 (stop value) its display up to 10.

1 = step size (it will do additional of given values)

Output:

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

Example2:

Range(1,11,1)

(I = 1 , I < 11 , I + 1)

I = 1,2,3,4,5,6,7,8,9,10

Range(1,10,1)

(I = 1 , I < 10, I + 1)

I = 1,2,3,4,5,6,7,8,9

Example3:

if start value didn't give than

```
for I in range(5):
        print(i)
```

output:

```
0
1
2
3
4
```

Default start value is 0

Step value is 1

Example4:

Name= "Lohith"

```
For I in range(0,len(name),1): #for categorical values have calculate with lenth function.
        Print(I,name[i])
```

i= i is variable index or counter

name[i] = refers to accessing the element at index i from the list or array name.

Output:

```
0 l
1 o
2 h
3 i
4 t
5 h
```

---

1) write a program to print even numbers from 1 to 20

```
for I in range(1,11,1):
        if(i%2==0):
                print(i,"=even number")
        else:
                print(i,"=odd number")
```

if(i%2==0):

- this checks weather the current number i is even
- % is the modulo operator, which gives the remainder when i is divided by 2.
- If the remainder is 0, i is an even number.

Print(I,"=even number")

- Prints the current number I followed by the text = even number if the number is even.

Else:print(I,"= odd number")

- If the number is not even, it prints the number followed by = odd number.

Output:

```
1 = odd number
2 = even number
3 = odd number
4 = even number
5 = odd number
6 = even number
7 = odd number
8 = even number
9 = odd number
10 = even number
```

---

2) Write a program to print tables of given number.

```
Num = int(input())

For I in range(1,11,1):

        Print(f"{num}x{i}={num*i}")
```

Num = int(input()):

- The int () function convert this input string to an integer
- Takes input from the user using the input() function, which reads input as a string.
- This means user is expected to enter a number which gets stored as an integer in the variable num.

For I in range(1,11,1)

- This loop iterates over numbers from 1 to 10 (inclusive), incrementing by 1 each time.

Print(f"{num}x{i}={num*i}")

- Uses an f-string (formatted string literal) to print the multiplication of num and I in a formatted way.
- For example ,if num is 5 and I is 3, it will print 5*3=15.

Output:

```
 3
3 * 1 = 3
3 * 2 = 6
3 * 3 = 9
3 * 4 = 12
3 * 5 = 15
3 * 6 = 18
3 * 7 = 21
3 * 8 = 24
3 * 9 = 27
3 * 10 = 30
```

---

3) Write a program to print factorial of a given number.

```
X=int(input())

Fact=1
```

```
For I in range(x,0,-1)
        Fact=fact*i
        Print(Fact)
```

x=int(input()):

- Initializes the variable fact to 1, which will hold the running product.

For I in range(x,0,-1):

- This loop starts from x and decrements by 1 each iteration down to 1.
- The range function arguments (start,stop,step) here mean loop from x down to 1.

Fact=Fact*i:

- Multiplying the current values of fact by I to accumulate the factorial product.

Print(Fact):

- Prints the current factorial value at each step of the loop.

Output:

```
 5
5
20
60
120
120
```

---

4) Write a program to calculate sum of 1st 5 numbers from 1 to 5.

```
S=0
For I in range(1,6,1):
        S = s+i
        Print(s)
```

S = 0

- Initializes the variable s to zero. This variable will accumulate the sum of number.

For I in range(1,6,1)

- A for loop that iterates over the number from 1 to 5 (since range(1,6) generates numbers starting at 1 up to but not including.
- The 1 as the step means the loop increment by 1 each iterates.

S = S+i

- Adds the current values of I to the sum variable s and stores it back into s.

Print(s)

- Prints the current sum after each addition.

Output:

```
1
3
6
10
15
```

---

5) Write a program to calculate sum of values of given range.

```
Sum=int(input("Enter the values:"))
For I in range(1,sum,1)
        Sum += 1
        Print(sum)
```

Sum=int(input("Enter the values:"))

- Takes an integer input from the user and stores it in the variable sum.

For I In range(1,sum,1)

- Loops with I taking values from 1 up to(but not including) the current value of sum at the time the loop starts.
- The loop increments by 1 on each iteration.

Sum += 1

- Increments the variable sum by 1 on every iteration.

Print(sum)

- Prints the current values of sum after incrementing.

Output:

```
Enter sum values: 9
10
11
12
13
14
15
16
17
```

---

6) Write a program to count number of odd numbers from 1 to 30.

```
Count=0
For I in range(1,31,1):
        If(i%2==1):
                Count = count + 1
Print(count)
```

Count = 0

- Initializes a variable count to zero to keep track of the number of odd numbers.

For I in range(1,31,1)

- Loops through numbers starting from 1 up to 30 (since range excludes the stop value 31)
- The step 1 means increment by 1 in each iteration.

If(i%2==1)

- Checks if the number I is odd.
- The modulo operator % returns the remainder of division by 2.
- If the remainder is 1, the number is odd.

Count = count + 1

- Increments count by one when an odd number is found

Print(count)

- Prints the total count of odd numbers found in the loop.

Output: 15

---

7) write a program to count total number of values, num of even, num of odd within a given range.

```
Sr = int(input())  #startingn range
Er = int(input())  #ending range
Nc = 0
Oc = 0
Ec = 0
For I in range(sr,er+1,1):
        Nc = nc+1
        If(i%2==0):
                Oc = oc+1
        Else:
                Ec = ec+1
Print(f"num of values {nc}\nnum of even {ec}\nnum of odd{oc}")
```

Sr = int(input()) and Er = int(input())

- take two integer inputs from the user indicating the start(sr) and end (er) of the range.

Nc = 0, Oc = 0 , Ec = 0

- initialize counters for:
  - nc: total number of count
  - oc: odd count
  - ec: even count

for I in range(sr,er+1,1):

- loops from sr to er inclusive.

Inside the loop:

- **nc increments by 1 for every number,counting total numbers.**

- **The if (i%2==0) checks if the number I is even:**
  - **If yes, increment oc (odd count)-this looks swapped or mistaken.**
  - **Else increment ec (even count).**

Print(f"num of values {nc}\nnum of even {ec}\nnum of odd{oc}")

- **Prints total counts of numbers, even numbers , and odd numbers.**

Output:

```
 1
 50
num of values 50
num of even 25
num of odd 25
```
