Looping Structures

1. Write a Python program to print the numbers from 1 to 10 using a for loop.

```python
for a in range(1,11):
    print(a)

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

2. Write a Python program to print the numbers from 20 to 1 using a while loop

```python
a=0
while a<20:
    a+=1
    print(a)

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

3. Write a program to print even numbers from 1 to 10.

```python
for e in range(1,11):
    if e%2==0:
        print(e)
```

```
2
4
6
8
10
```

4. Write a program that prompts the user to enter a number n and prints all the numbers from 1 to n.

```python
n=int(input("Enter number:"))
for n in range(1,n+1):
    print(n)
```

```
Enter number: 18

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

5. Write a program that prompts the user to enter a number n, and then prints all the odd numbers between 1 and n.

```python
n1=int(input("Enter number:"))
for n1 in range(1,n1):
    if n1%2!=0:
        print(n1)
```

```
Enter number: 18
```

```
1
3
5
7
9
11
13
15
17
```

6. Write a program that prints 'Happy Birthday!' five times on screen

```python
for a in range(1,6):
    print(a,"Happy Birthday!")
```

```
1 Happy Birthday!
2 Happy Birthday!
3 Happy Birthday!
4 Happy Birthday!
5 Happy Birthday!
```

7. Write a program that takes a number n as input from the user and generates the first n terms of the series formed by squaring the natural numbers.

```python
n2=int(input("Enter Number:"))
for n2 in range(1,n2+1):
    print(n2**2)
```

```
Enter Number: 6

1
4
9
16
25
36
```

8. Write a program that prompts the user to input a number and prints its multiplication table.

```python
n3=int(input("Enter Number:"))
for n in range(1,11):
    print(f"{n3} x {n} = {n3*n}")
```

```
Enter Number: 6

6 x 1 = 6
6 x 2 = 12
```

```
6 x 3 = 18
6 x 4 = 24
6 x 5 = 30
6 x 6 = 36
6 x 7 = 42
6 x 8 = 48
6 x 9 = 54
6 x 10 = 60
```

9. Write a Python program to print the first 8 terms of an arithmetic progression starting with 3 and having a common difference of 4.

```python
for d in range(3,32,4):
    print(d)

3
7
11
15
19
23
27
31
```

10. Write a Python program to print the first 6 terms of a geometric sequence starting with 2 and having a common ratio of 3.

```python
st=2
cr=3
for c in range(6):
    print(st)
    st*=cr

2
6
18
54
162
486
```

11. Write a program that asks the user for a positive integer value. The program should calculate the sum of all the integers from 1 up to the number entered.

```python
num=int(input("Enter a positive number:"))
tot=0
for i in range(1,num+1):
```

```
    tot+=i
print(f"The sum from 1 to {num} is {tot}")

Enter a positive number: 20

The sum from 1 to 20 is 210
```

12. write a program that takes a positive integer N as input and calculates the sum of the reciprocals of all numbers from 1 up to N

```
num=int(input("Enter a positive number:"))
rec=0
init=1
for i in range(1,num+1):
    rec+=1/i
print(f"The sum of reciprocal from {init} to {num} is: {rec}")


Enter a positive number: 5

The sum of reciprocal from 1 to 5 is: 2.283333333333333
```

13. Write a program that prompts the user to enter a number and repeats this process 5 times. The program should accumulate the numbers entered and then display the final running total.

```
total=0
num=0
for c in range(5):
    num=int(input("Enter a number:"))
    total+=num
print(f'The total is {total}')

Enter a number: 21
Enter a number: 23
Enter a number: 43
Enter a number: 34
Enter a number: 45

The total is 166
```

14. Write a program that prompts the user to enter a positive integer and calculates its factorial. The factorial of a positive integer 'n' is denoted as 'n!' and is calculated by multiplying all the integers from 1 to 'n' together. For example, the factorial of 5 (denoted as 5!) is calculated as 1 x 2 x 3 x 4 x 5.

The program should display the factorial value if the input is a positive number, or display a message stating that the factorial does not exist for negative numbers. Additionally, for an input of zero, the program should output that the factorial of 0 is 1.

```python
num=int(input("Enter a positive number:"))
tot=1
if num>0:
    for i in range(1,num+1):
        tot=tot*i
    print(f"The Factorial of {num} is {tot}")
elif num==0:
    print("The factorial of 0 is 1")
elif num<0:
    print("Factorial does not exist for negative numbers")


Enter a positive number: 5

The Factorial of 5 is 120
```

15. Write a Python program that prompts the user to enter a base number and an exponent, and then calculates the power of the base to the exponent. The program should not use the exponentiation operator (**) or the math.pow() function. The program should handle both positive and negative exponents.

```python
base=int(input("Enter base number:"))
expo=int(input("Enter exponent:"))
r=1
for a in range(1,expo+1):
    r*=base
print(r)

Enter base number: 2
Enter exponent: 3

8
```