

# Looping Structures

1. Write a Python program to print the numbers from 1 to 10 using a for loop.
2. Write a Python program to print the numbers from 20 to 1 using a while loop.
3. Write a program to print even numbers from 1 to 10.
4. Write a program that prompts the user to enter a number  $n$  and prints all the numbers from 1 to  $n$ .
5. Write a program that prompts the user to enter a number  $n$ , and then prints all the odd numbers between 1 and  $n$ .
6. Write a program that prints 'Happy Birthday!' five times on screen.
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.

Sample output

Enter a number: 6

The first 6 terms of the series are:

1 4 9 16 25 36

8. Write a program that prompts the user to input a number and prints its multiplication table.
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.  
The program should output the following sequence:  
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.  
The program should output the following sequence:  
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. For example, if the user enters 20, the loop will find the sum of 1, 2, 3, 4, ... 20.
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  $N$ . The program should display the final sum.

Output of the program should be like:

Enter a positive integer: 5

The sum of reciprocals from 1 to 5 is: 2.28

**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.

Sample Output:

Enter a number: 10

Enter a number: 15

Enter a number: 35

Enter a number: 40

Enter a number: 50

The final running total is: 150

**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  $1 \times 2 \times 3 \times 4 \times 5$ .

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.

**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.