Exercise 1: Print First 10 natural numbers using while loop

Expected output:

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

Exercise 2: Print the following pattern

Write a program to print the following number pattern using a loop.

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

Hint

- Decide the row count, i.e., 5, because the pattern contains five rows
- Run outer for loop 5 times using for loop and range() function
- Run inner for loop `i+1` times using `for` loop and `range()` function
    - In the first iteration of the outer loop, the inner loop will execute 1 time
    - In the second iteration of the outer loop, the inner loop will execute 2 time
    - In the third iteration of the outer loop, the inner loop will execute 3 times, and so on till row 5
- print the value of `j` in each iteration of inner loop (`j` is the the inner loop iterator variable)
- Display an empty line at the end of each iteration of the outer loop (empty line after each row)

Exercise 3: Calculate the sum of all numbers from 1 to a given number

Write a program to accept a number from a user and calculate the sum of all numbers from 1 to a given number

For example, if the user entered 10 the output should be 55 (`1+2+3+4+5+6+7+8+9+10`)

Expected Output:

```
Enter number 10
Sum is:  55
```

Hint

Approach 1: Use `for` loop and `range()` function

- Create variable `s = 0` to store the sum of all numbers

- Use Python 3's built-in function `input()` to take input from a user
- Convert user input to the integer type using the `int()` constructor and save it to variable `n`
- Run loop `n` times using for loop and range() function
- In each iteration of a loop, add current number (`i`) to variable `s`
- Use the `print()` function to display the variable `s` on screen

Approach 2: Use the built-in function sum(). The sum() function calculates the addition of numbers in the list or range

Exercise 4: Write a program to print multiplication table of a given number

For example, `num = 2` so the output should be

```
2
4
6
8
10
12
14
16
18
20
```

Hint

- Set `n =2`
- Use `for` loop to iterate the first 10 numbers
- In each iteration, multiply 2 by the current number.(`p = n*i`)
- Print `p`

Exercise 5: Display numbers from a list using loop

Write a program to display only those numbers from a list that satisfy the following conditions

- **The number must be divisible by five**
- **If the number is greater than 150, then skip it and move to the next number**
- **If the number is greater than 500, then stop the loop**

Given:

```
numbers = [12, 75, 150, 180, 145, 525, 50]
```

Expected output:

```
75
150
145
```

Hint

- **Use for loop to iterate each item of a list**
- **Use `break` statement to break the loop if the current number is greater than 500**
- **use `continue` statement move to next number if the current number is greater than 150**
- **Use `number % 5 == 0` condition to check if number is divisible by 5**

Exercise 6: Count the total number of digits in a number

Write a program to count the total number of digits in a number using a while loop.

For example, the number is 75869, so the output should be 5

Hint

- **Set `counter = 0`**
- **Run while loop till `number != 0`**
- **In each iteration of loop**
    - **Reduce the last digit from the number using floor division (`number = number // 10`)**
    - **Increment counter by 1**
- **print counter**

Exercise 7: Print the following pattern

Write a program to use `for` loop to print the following reverse number pattern

```
5 4 3 2 1
4 3 2 1
3 2 1
2 1
1
```

Hint

- **Set `row = 5` because the above pattern contains five rows**
- **create an outer loop to iterate numbers from 1 to 5 using `for` loop and `range()` function**
- **Create an inner loop inside the outer loop in such a way that in each iteration of the outer loop, the inner loop iteration will be reduced by `i`. `i` is the current number of an outer loop**
- **In each iteration of the inner loop, print the iterator variable of the inner loop (`j`)**

Note:

- **In the first iteration of the outer loop inner loop execute five times.**
- **In the second iteration of the outer loop inner loop execute four times.**
- **In the last iteration of the outer loop, the inner loop will execute only once**

Exercise 8: Print list in reverse order using a loop

Given:

```
list1 = [10, 20, 30, 40, 50]
```

Expected output:

```
50
40
30
20
10
```

Hint

Approach 1: Use the built-in function `reversed()` to reverse the list

Approach 2: Use for loop and the `len()` function

- **Get the size of a list using the `len(list1)` function**
- **Use `for` loop and reverse `range()` to iterate index number in reverse order starting from length-1 to 0. In each iteration, i will be reduced by 1**
- **In each iteration, print list item using `list1[i]`. i is the current value if the index**

Exercise 9: Display numbers from -10 to -1 using for loop

Expected output:

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

Exercise 10: Use else block to display a message “Done” after successful execution of for loop

For example, the following loop will execute without any error.

Given:

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

Expected Output:

```
0
1
2
3
4
Done!
```

Hint

Same as the `if` statement, Python allows us to use an else block along with `for` loop. `for` loop can have the `else` block, which will be executed when the loop terminates normally.

Exercise 11: Write a program to display all prime numbers within a range

Note: A Prime Number is a number that cannot be made by multiplying other whole numbers. A prime number is a natural number greater than 1 that is not a product of two smaller natural numbers

Examples:

- **6 is not a prime mumber because it can be made by 2×3 = 6**
- **37 is a prime number because no other whole numbers multiply together to make it.**

Given:

```
# range
start = 25
end = 50
```

Expected Output:

```
Prime numbers between 25 and 50 are:
29
31
37
41
43
47
```

Exercise 12: Display Fibonacci series up to 10 terms

The Fibonacci Sequence is a series of numbers. The next number is found by adding up the two numbers before it. The first two numbers are 0 and 1.

For example, 0, 1, 1, 2, 3, 5, 8, 13, 21. The next number in this series above is 13+21 = 34.

Expected output:

```
Fibonacci sequence:
0  1  1  2  3  5  8  13  21  34
```

Hint

- **Set `num1 = 0` and `num2 =1` (first two numbers of the sequence)**
- **Run loop ten times**
- **In each iteration**
    - **print `num1` as the current number of the sequence**
    - **Add last two numbers to get the next number `res = num1+ num2`**
    - **update values of `num1` and `num2`. Set `num1=num2` and `num2=res`**

Exercise 13: Find the factorial of a given number

Write a program to use the loop to find the factorial of a given number.

The factorial (symbol: `!`) means to multiply all whole numbers from the chosen number down to 1.

For example: calculate the factorial of 5

```
5! = 5 x 4 x 3 x 2 x 1 = 120
```

Expected output:

```
120
```

Hint

- **Set variable `factorial =1` to store factorial of a given number**
- **Iterate numbers starting from 1 to the given number `n` using for loop and `range()` function. (here, the loop will run five times because `n` is 5)**
- **In each iteration, multiply factorial by the current number and assign it again to a factorial variable (`factorial = factorial *i`)**
- **After the loop completes, print `factorial`**

Exercise 14: Reverse a given integer number

Given:

76542

Expected output:

24567

Exercise 15: Use a loop to display elements from a given list present at odd index positions

Given:

```
my_list = [10, 20, 30, 40, 50, 60, 70, 80, 90, 100]
```

Expected output:

```
20 40 60 80 100
```

Hint

Use list slicing. Using list slicing, we can access a range of elements from a list

Exercise 16: Calculate the cube of all numbers from 1 to a given number

Write a program to rint the cube of all numbers from 1 to a given number

Given:

```
input_number = 6
```

Expected output:

```
Current Number is : 1  and the cube is 1
Current Number is : 2  and the cube is 8
Current Number is : 3  and the cube is 27
Current Number is : 4  and the cube is 64
Current Number is : 5  and the cube is 125
Current Number is : 6  and the cube is 216
```

Hint

- Iterate numbers from 1 to `n` using for loop and `range()` function
- In each iteration of a loop, calculate the cube of a current number (`i`) by multiplying itself three times (`c = i * i* i)`

Exercise 17: Find the sum of the series upto n terms

Write a program to calculate the sum of series up to n term. For example, if `n =5` the series will become 2 + 22 + 222 + 2222 + 22222 = 24690

Given:

```
n = 5
```

Expected output:

```
24690
```

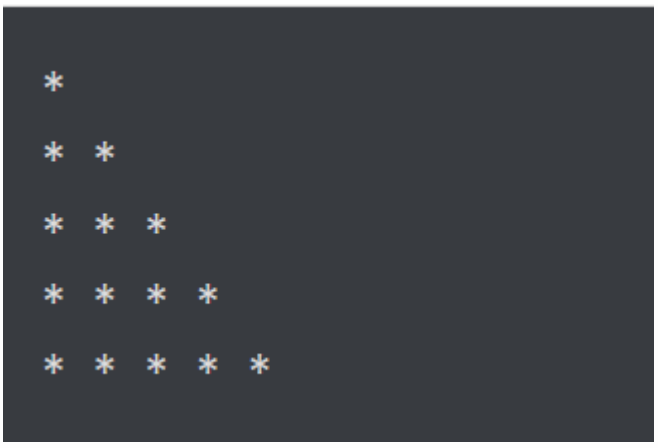
Exercise 18: Print the following pattern

Write a program to print the following start pattern using the `for` loop

Hint

Use two for loops. First for loop to print the upper pattern and second for loop to print lower pattern

First Pattern:



Second Pattern: