# Python Assignment: For Loops and Nested For Loops

**Objective:**  
Practice for loops and nested for loops to solve various coding challenges. This assignment covers a range of problems to reinforce understanding of loop structures, patterns, number manipulation, and string processing in Python.

## Instructions:

• Solve each question in Python.

• Write clean and well-commented code.

• Test your code to ensure accuracy and correctness.

## Questions:

1. Print Right Triangle Star Pattern  
Write a Python program to print the following pattern for `n` rows:

Input: n = 5  
Output:  
\*  
\* \*  
\* \* \*  
\* \* \* \*  
\* \* \* \* \*

2. Print Inverted Right Triangle Star Pattern  
Write a program to print an inverted right triangle pattern for `n` rows:

Input: n = 5  
Output:  
\* \* \* \* \*  
\* \* \* \*  
\* \* \*  
\* \*  
\*

3. Triangle with Repeating Numbers  
Write a program to print the following number pattern:  
Input: n = 4  
Output:  
1  
2 2  
3 3 3  
4 4 4 4

4. Triangle with Ascending Numbers in Rows  
Write a program to print the following pattern:  
Input: n = 5  
Output:  
1  
1 2  
1 2 3  
1 2 3 4  
1 2 3 4 5

5. Descending Number Triangle  
Print a pattern where each row contains numbers in descending order:  
Input: n = 5  
Output:  
5 4 3 2 1  
4 3 2 1  
3 2 1  
2 1  
1

6. Hollow Square Pattern  
Write a program to print a hollow square pattern with `n` rows:  
Input: n = 5  
Output:  
\* \* \* \* \*  
\* \*  
\* \*  
\* \*  
\* \* \* \* \*

7. Diamond Pattern  
Write a program to print a diamond pattern with `2n - 1` rows:  
Input: n = 3  
Output:  
 \*  
 \* \*  
 \* \* \*  
 \* \*  
 \*

8. Pascal's Triangle  
Write a program to print Pascal's Triangle with `n` rows:  
Input: n = 5  
Output:  
 1  
 1 1  
 1 2 1  
 1 3 3 1  
 1 4 6 4 1

9. Sum of Even Numbers: Write a program that calculates the sum of all even numbers up to `n`.

10. Factorial Calculation: Write a program to calculate the factorial of a given number `n` using a `for` loop.

11 Prime Numbers Up to n: Write a program to print all prime numbers up to `n`.

12. Vowel Counter: Write a program to count the vowels in a given string using a `for` loop.

13.Reverse a String: Write a program to reverse a given string without using any built-in reverse functions.

14. Substring Finder: Write a program that finds and prints all substrings of a given string.

15. Character Frequency Counter: Write a program to print all unique characters and their frequencies in a given string.

16. Fibonacci Sequence: Write a program that prints the Fibonacci sequence up to `n` terms.

17. Multiplication Table: Write a program that prints a multiplication table for numbers from `1` to `10`.

18. Matrix Pattern: Write a program to generate a matrix pattern based on the input `n`:  
Input: n = 3  
Output:  
1 2 3  
4 5 6  
7 8 9