Pattern Questions :

Print these patterns using loops:

```text

1.  *****
    *****
    *****
    *****
    *****


2.  *
    **
    ***
    ****
    *****


3.  *****
    ****
    ***
    **
    *


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

```
5.  *
    **
    ***
    ****
    *****
    ****
    ***
    **
    *


6.       *
        **
       ***
      ****
     *****


7.   *****
      ****
       ***
        **
         *


8.       *
        ***
       *****
      *******
     *********


9.  *********
     *******
      *****
       ***
        *
```

10.
```
      *
     * *
    * * *
   * * * *
  * * * * *
```

11.
```
  * * * * *
   * * * *
    * * *
     * *
      *
```

12.
```
  * * * * *
   * * * *
    * * *
     * *
      *
      *
     * *
    * * *
   * * * *
  * * * * *
```

13.
```
      *
     * *
    *   *
   *     *
  *********
```

14.
```
  *********
   *     *
    *   *
     * *
      *
```

15.

16.

17.

18.

19.

```
*        *
**      **
***    ***
****  ****
**********
****  ****
***    ***
**      **
*        *
```

20.

```
*****
*   *
*   *
*   *
*****
```

21.

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

22.

```
1
0 1
1 0 1
0 1 0 1
1 0 1 0 1
```

23.

```
******
*****
****
***
**
*
**
***
****
*****
******
```

24.

25.

```
   *****
  *   *
 *   *
*   *
*****
```

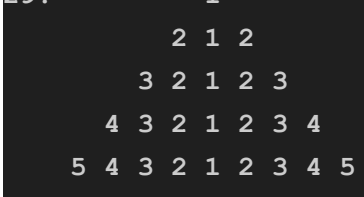
26.

```
1 1 1 1 1 1
2 2 2 2 2
3 3 3 3
4 4 4
5 5
6
```

27.

28.

29.



30.

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

31.

```
    E
  D E
C D E
B C D E
A B C D E
```

32.

```
    a
  B c
  D e F
  g H i J
  k L m N o
```

33.

```
E D C B A
D C B A
C B A
B A
A
```

34.

```
1      1
12    21
123  321
12344321
```

35.
```
 1
 3  2
 4  5 6
 10 9 8 7
```

36.
```
1
1 2
2 3 5
5 7 10 15
15 20 27 37 52
```

(bell triangle or Aitken's array)

37.
```
* * * * * * * * * * *
* @ @ *     *     *
* @ @ *     *     *
* * * * * * * * * * *
*     * @ @ *     *
*     * @ @ *     *
* * * * * * * * * * *
*     *     * @ @ *
*     *     * @ @ *
* * * * * * * * * * *
```

38.
```
            1
          2 3 4
        3 4 5 6 7
      4 5 6 7 8 9 10
    5 6 7 8 9 10 11 12 13
```

39.

```
     *
     # *
     * # *
     # * # *

40.

          3 3 3
          3 1 3
          3 2 3
          3 3 3




```

LOGICAL QUESTION:

Q1.Write a program that checks if a number is positive, negative, or zero.
Q2.Write a program that checks if a number is even or odd.
Q3.Write a program to check if a given year is a leap year.
Q4.Write a program to find the largest of three numbers.
Q5.Write a program that assigns a grade based on a student's score.
Q6.Write a program to check if a given character is a vowel or consonant.

Q7.Write a program to check if a given number is divisible by 5 and 11.
Q8.Write a program to check if a given string is a palindrome.
Q9.Write a program to check if a given number is a prime number.
Q10.Write a program to find the smallest of four numbers.
Q11.Write a program to print fibonacci series.
Q12.Write a program to demonstrate the use of switch cases.
Q13.Write a program to check whether a given number is Palindrome or not .
Q14.Write a program to reverse a given number .
Q15.Write a program to check whether a given number is armstrong or not.
Q16.Write a program to find the area of a circle (π×r2).
Q17.Write a program to print prime numbers between given numbers range.
Q18.Write a program to check whether a given number is a Perfect Number or not (a perfect number is a positive integer that is equal to the sum of its positive proper divisors, that is, divisors excluding the number itself.).
Example: For instance, 6 has proper divisors 1, 2 and 3, and 1 + 2 + 3 = 6, so 6 is a perfect number. The next perfect number is 28, since 1 + 2 + 4 + 7 + 14 = 28.

Q19.Write a program to check whether a given number is a strong number or not .
Eg. A strong number is one in which the factorial of the digits equals the number itself. 1, 2, 145, and 40585 are some examples of strong numbers.

145 is a strong number .
Let's check how 🤔

Factorial of 1 is 1.
Factorial of 4 is 24.
Factorial of 5 is 120.

Now add every factorial value : 1+24+120 =145

That means Answer is an equal to enter number.
(145 =145)

Q20. Find the maximum , minimum and sum of all numbers from the given array .
Num = [1,5,7,9,-1,10,40,4,49]

Q21.The Two Sum problem:

- Given an array of integers **nums** and an integer **target**, return indices of the two numbers such that they add up to target.

You may assume that each input would have exactly one solution, and you may not use the same element twice.

You can return the answer in any order.
Example 1:

Input: nums = [2,7,11,15], target = 9
Output: [0,1]
Explanation: Because nums[0] + nums[1] == 9, we return [0, 1].

Example 2:

Input: nums = [3,2,4], target = 6
Output: [1,2]
Example 3:

Input: nums = [3,3], target = 6
Output: [0,1]

Q22.Find Factorial using recursion.
Q23.Find the sum of N natural numbers using recursive method or without recursive method.
Q24.Write a program to swap two numbers using the third variable and without the third variable .
Q25.Write a program to transpose a matrix .
Q26.Calculate the electricity bill according to given rate :

You're tasked with implementing a program to calculate the electricity bill for a residential customer based on their monthly usage.

The electricity company charges customers based on the following criteria:

- **0 to 100 units are charged at a standard rate of RS 4 per unit.**
- **101 to 150 units are charged at a reduced rate of RS 5 per unit.**
- **151 to 200 units are charged at a reduced rate of RS 6 per unit.**
- **201 to 300 units are charged at a reduced rate of RS 8 per unit.**
- **Any additional units beyond 300 are charged at a higher rate of RS 10 per unit.**