WEEK 1

1. Write a Python program that asks the user for his name and then welcomes him.
2. Write a Python program that accepts principle, rate, and time from the user and prints the simple interest.
3. Write a Python program that prompts the user to input principle, rate, and time and calculate compound interest.
4. Write a program in Python to calculate the area and perimeter of various polygons such as triangles, rectangles, and circles.

5. Write a program in Python to input 3 numbers separated by comma, and find the largest and smallest among them.

6. Write a program in Python to find the roots of a quadratic equation using Python.

7. Write a program in Python to print all prime numbers inside a range of numbers provided by the user.

8. Write a program in Python to print the mean and standard deviation of 5 scores input by the user.
9. Write a program in Python to create a calculator that can perform basic arithmetic operations.
10. Write a program in Python to convert temperatures between Celsius and Fahrenheit.
11. Write a program in Python to check whether an input is even or odd.
12. Write a program in Python to check whether an input is leap year or not.
13. Write a python program that prompts the user to enter a number and determines whether it is positive, negative, or zero.
14. Write a program that prompts the user to enter their age and prints the corresponding age group. The program should use the following age groups:

    0-12:   Child
    13-19:   Teenager
    20-59:   Adult
    60 and above: Senior Citizen

15. Write a program that prompts the user to enter their weight (in kilograms) and height (in meters). The program should calculate the Body Mass Index (BMI) using the formula: BMI = weight / (height * height). The program should then classify the BMI into one of the following categories:

    less than 18.5 - Underweight
    BMI between 18.5 and 24.9 - Normal weight
    BMI between 25 and 29.9 - Overweight
    BMI 30 or greater - Obesity

WEEK 2

1. Write a Python program that prompts the user to input a number from 1 to 7. The program should display the corresponding day for the given number. For example, if the user types 1, the output should be Sunday. If the user types 7, the output should be Saturday.
2. Write a Python program that prompts the user to input the number of calls and calculate the monthly telephone bills as per the following rule:
   Minimum Rs. 200 for up to 100 calls.
   Plus Rs. 0.60 per call for the next 50 calls.
   Plus Rs. 0.50 per call for the next 50 calls.
   Plus Rs. 0.40 per call for any call beyond 200 calls.
3. Write a program in Python to calculate the factorial of a number.
4. Write a program in Python to calculate the Fibonacci sequence till a specific no. of terms.
5. Write a program in Python to calculate the factors of numbers.
6. Write a program in Python to calculate the magic square based on a given number.
7. Write a program in Python to check if a number is a palindrome.
8. Write a program in Python to check if a number is an Armstrong number.
9. Write a program in Python to check if a number is Krishnamurthy number.
10. Write a program in Python to find the sum of digits of a number.
11. Write a program in Python to reverse a given number.
12. Write a program in Python to find the sum of squares of the first n natural numbers.
13. Write a program in Python to convert a decimal number to a binary number.
14. Write a program in Python that prompts the user to input a number and prints its multiplication table.
15. Write a Python program to print the first 6 terms of a geometric sequence starting with 2 and having a common ratio of 3.

WEEK 3

1. Print the series upto N terms: 1, 4, 9, 16, 25, 36…
2. Print the series up to N terms: 2, 4, 8, 16, 32, 64…
3. Print the series upto N terms: 1, 3, 7, 13, 21, 31…..
4. Print the series upto N terms: 1, 2, 4, 8, 16, 23, 28, 38, 49, 62 …
5. Print the series upto N terms: 1,2,6,24,120,720 …
6. 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.
7. 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.
8. Write a Python program that prompts the user to enter a positive integer. Your program should display all the factors of the number. Additionally, calculate and display the sum of its factors.
9. Write a python program that uses a loop to repeatedly ask the user to enter integers. The loop will come to an end when zero is entered. After collecting all the integers, the program will compute and display the average of all the entered numbers.
10. Write a python program to enter the numbers till the user wants and at the end it should display the count of positive, negative and zeros entered.
11. Write a python program that prompts the user to input two numbers and display its HCF.
12. Write a python program to add first seven terms of the following series using a for loop:

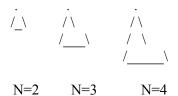$$\frac{1}{1!} + \frac{2}{2!} + \frac{3}{3!} + \cdots$$

13. Compute the sum up to n terms in the series
    1 - 1/2 + 1/3 - 1/4 + 1/5 -... 1/n where n is a positive integer and input by user.
14. Write a program to compute sin x for given x. The user should supply x and a positive integer n. We compute the sine of x using the series and the computation should use all terms in the series up through the term involving x^n
    sin x = x - x^3/3! + x^5/5! - x^7/7! + x^9/9! ……..
15. Write a program to compute cosine of x. The user should supply x and a positive integer n. We compute the cosine of x using the series and the computation should use all terms in the series up through the term involving x^n
    cos x = 1 - x^2/2! + x^4/4! - x^6/6! ....

1. Print the pattern upto N Lines:

```
  .          .              .
 /_\        /\            /\
          /___\         /  \
                       /_____\

  N=2       N=3           N=4
```

2. Print a number as a 8 segment display N Lines:

```
        _          _
       _|         _|        |_|
      |_         _|          |

      N=2        N=3        N=4
```

3. Print the pattern upto N lines:

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

4. Print the following pattern upto N lines:

```
   1

  1 1

 1 2 1

1 3 3 1

1 4 6 4 1

1 5 10 10 5 1 …
```

5. Print the shape for Height = N

***	****	*****
* *	* *	* *
***	* *	* *
	****	* *
		*****
N=3	N=4	N=5

6. Floyd's triangle is a right-angled triangular array of natural numbers as shown below:

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

Write a program to print the Floy'd triangle.

7. Write programs to print following patterns :

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

8.

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

9.

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

10.

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

11.

```
        1
       222
      33333
     4444444
    555555555
```

12.

```
        1
       212
      32123
     4321234
    543212345
```

13. Write a program that prints the following diamond pattern:
```
  1
 123
12345
 123
  1
```

14. Write a program that takes an integer input n and prints a pattern using the multiplication table from 1 to n. Each cell in the pattern should contain the product of its row and column numbers. Here is a sample output:

Enter a number: 5

```
1 2  3  4  5
2 4  6  8  10
3 6  9  12 15
4 8  12 16 20
5 10 15 20 25
```

15. Write a program that takes an integer input n and prints all prime numbers from 2 to n using nested loops. Here is a sample output:
Enter a number: 20
2 3 5 7 11 13 17 19

WEEK 5

1. Write a python program that accepts a string from user. Your program should count and display number of vowels in that string.
2. Write a python program that reads a string from the keyboard and display:
   * The number of uppercase letters in the string
   * The number of lowercase letters in the string
   * The number of digits in the string
   * The number of whitespace characters in the string
3. Write a Python program that accepts a string from user. Your program should create and display a new string where the first and last characters have been exchanged.
   For example if the user enters the string 'HELLO' then new string would be 'OELLH'
4. Write a Python program that accepts a string from user. Your program should create a new string in reverse of first string and display it.

   For example if the user enters the string 'EXAM' then new string would be 'MAXE'

5. Write a Python program that accepts a string from user. Your program should create a new string by shifting one position to left.

   For example if the user enters the string 'examination 2021' then new string would be 'xamination 2021e'

6. Write a program that asks the user to input his name and print its initials. Assuming that the user always types first name, middle name and last name and does not include any unnecessary spaces.

   For example, if the user enters Ajay Kumar Garg the program should display A. K. G. Note: Don't use split() method

7. Write a program that determines whether the string is a palindrome.
8. Write a program that display following output:
   SHIFT
   HIFTS
   IFTSH
   FTSHI
   TSHIF
   SHIFT
9. Write a program in python that accepts a string to setup a passwords. Your entered password must meet the following requirements:

   ● The password must be at least eight characters long.
   ● It must contain at least one uppercase letter.
   ● It must contain at least one lowercase letter.
   ● It must contain at least one numeric digit.

Your program should should perform this validation.

10. Write a python program to check whether an input of an arithmetic expression is correct or not.

WEEK 6

1. Write a program to Insert and Delete elements from list based on a given position.
2. Find out Mean, Median and Mode of a list of numbers.
3. Sort a list of numbers without using a user defined function.
4. Use a dictionary to count the frequency of words in a string input by the user.
5. Given a list of numbers return the indices in which a specific number occurs.
6. Find and display the largest number of a list without using built-in function max().
7. Write a program that accepts a list from user and print the alternate element of list.
8. Write a program that rotates the element of a list so that the element at the first index moves to the second index, the element in the second index moves to the third index, etc., and the element in the last index moves to the first index.
9. Write a program that input a string and ask user to delete a given word from a string.
10. Write a program that reads a string from the user containing a date in the form mm/dd/yyyy. It should print the date in the form March 12, 2021.
11. Write a program with a function that accepts a string from keyboard and create a new string after converting character of each word capitalized. For instance, if the sentence is "stop and smell the roses." the output should be "Stop And Smell The Roses"
12. Find the sum of each row of matrix of size m x n. For example for the following matrix output will be like this :

$$
\begin{array}{cccc}
2 & 11 & 7 & 12 \\
5 & 2 & 9 & 15 \\
8 & 3 & 10 & 42 \\
\end{array}
$$

Sum of row 1 = 32
Sum of row 2 = 31
Sum of row 3 = 63

13. Write a program to add two matrices of size n x m.
14. Write a program to multiply two matrices.
15. Write a program to sort a matrix.

WEEK 7

1. Write a program to create a text file as per the path and filename provided by the user and add text as input by the user.
2. Write a program to copy the content of a text file to another file but while copying convert all capital letters to small letters.
3. Create a text file to append N lines such that each line displays the Fibonacci sequence upto the term corresponding to specific line number separated by '-'. For N = 5 the text file should read.

   1

   1-1

   1-1-2

   1-1-2-3

   1-1-2-3-5

4. Take input four values from user with respect to number of books, pens, bags and total price as follows. 36, 116, 23, 4649 and save it as a text file

      Books: 36

      Pens: 116

      Bags : 23

      Price : Rs. 4649

5. Write a program to create a dictionary by reading records from the text file output in program 4th
   Dictionary : {"Books":36, "Pens": 116, "Bags":23, "Price": "4649"}
6. Write a program to take inputs from user to create a dictionary for storing and displaying student data.
7. Store the dictionary data as a CSV file and write a function to display the data from the CSV file.
8. Write a function to update or delete a specific record in student database csv file.
9. Write a program to print all elements in a list those have only single occurrence.
10. Write a program to read 6 numbers and create a dictionary having keys EVEN and ODD. Dictionary's value should be stored in list. Your dictionary should be like: {'EVEN':[8,10,64], 'ODD':[1,5,9]}.
11. Write a program that reads string from user. Your program should create a dictionary having key as word length and value is count of words of that length. For example, if user enters 'A fat cat is on the mat'.

Word	Word length
A	1
fat	3
cat	3
is	2

```
on      2
the     3
mat     3
```
The content of dictionary should be {1:1, 3:4, 2:2}

12. Write a program to input roll numbers and their names of students of your class and store them in the dictionary as the key-value pair. Perform the following operations on the dictionary:
a) Display the Roll numbers and name for all students.
b) Add a new key-value pair in this dictionary and display the modified dictionary
c) Delete a particular student's record from the dictionary
d) Modify the name of an existing students.