Basic Programs

1. Write a program to ask user name and print welcome message with user name.
2. Write program to ask user for two numbers and add them.
3. Write program to ask user for two numbers and find difference between them.
4. Write a program to take a input string and print string length.
5. Write a program that takes two numbers as arguments and returns the largest of them.
6. Write a program to input any number and check whether it is even or odd.
7. Write a program to input angles of a triangle and check whether triangle is valid or not.
8. Write a program to input any alphabet and check whether it is vowel or consonant.
9. Write a program to input any year and check whether it is leap year or not.
10. Generate list of leap years from 1 AD to 2050 AD.

List Exercises

1. **Create and Display a List** – Write a Python program to create a list of numbers and print it.
2. **Access List Elements** – Write a Python script to access individual elements from a given list using indexing.
3. **Modify a List** – Write a program to replace a specific element in a list with a new value.
4. **Append and Extend a List** – Write a program that appends new values to a list and extends it with another list.
5. **Insert Elements at Specific Positions** – Write a Python script to insert an element at a specific position in a list.
6. **Remove Elements from a List** – Write a program that removes an element from a list using `remove()`, `pop()`, and `del`.
7. **Sort a List in Ascending and Descending Order** – Write a Python program to sort a list in both ascending and descending order.
8. **Reverse a List** – Write a script to reverse the order of elements in a list.
9. **Find the Maximum and Minimum Values in a List** – Write a Python program that finds and prints the largest and smallest values in a numeric list.
10. **Find the Sum and Average of List Elements** – Write a Python script that calculates the sum and average of all numbers in a list.
11. **Count Occurrences of an Element in a List** – Write a program that counts how many times a given element appears in a list.
12. **Find Duplicates in a List** – Write a Python script that identifies duplicate values in a list.

13. **Merge Two Lists** – Write a program to merge two lists into a single list.
14. **Remove Duplicates from a List** – Write a Python script to remove duplicate values while maintaining the order of elements.
15. **Convert a List into a String** – Write a program that converts a list of words into a single concatenated string.
16. **Find the Intersection of Two Lists** – Write a Python script that finds the common elements between two lists.
17. **Find the Union of Two Lists** – Write a Python program that merges two lists and removes duplicates.
18. **Find the Difference Between Two Lists** – Write a Python script that finds the elements that exist in one list but not in the other.
19. **Flatten a Nested List** – Write a Python program that flattens a list of lists into a single list.
20. **Find the Second Largest Number in a List** – Write a script to find the second highest value in a list.

Tuple Exercises

1. **Create and Display a Tuple** – Write a Python program to create a tuple and print its elements.
2. **Access Tuple Elements** – Write a Python script to access elements from a tuple using indexing.
3. **Modify a Tuple (Using Lists)** – Write a program to convert a tuple into a list, modify the list, and convert it back into a tuple.
4. **Unpack a Tuple into Variables** – Write a Python program to unpack the elements of a tuple into separate variables.
5. **Find the Length of a Tuple** – Write a script to find and print the number of elements in a tuple.
6. **Find the Maximum and Minimum Values in a Tuple** – Write a program to find the largest and smallest values in a numeric tuple.
7. **Concatenate Two Tuples** – Write a Python script to merge two tuples into a single tuple.
8. **Find the Index of an Element in a Tuple** – Write a Python program that finds the index of a specific value in a tuple.
9. **Check if an Element Exists in a Tuple** – Write a script to check whether a given element exists in a tuple.
10. **Convert a Tuple into a List and Vice Versa** – Write a Python program that converts a tuple into a list and then back into a tuple.
11. **Slice a Tuple** – Write a Python program that extracts a specific range of elements from a tuple using slicing.
12. **Find the Sum and Average of Tuple Elements** – Write a Python script that calculates the sum and average of numbers in a tuple.
13. **Find Duplicates in a Tuple** – Write a program to identify duplicate values in a tuple.

14. **Remove Duplicates from a Tuple** – Write a Python script to remove duplicate elements from a tuple.
15. **Sort a Tuple in Ascending and Descending Order** – Write a Python program to sort a tuple in both ascending and descending order.
16. **Convert a Tuple of Strings into a Single String** – Write a script to concatenate all elements in a tuple into a single string.
17. **Find the Intersection of Two Tuples** – Write a Python program that finds common elements between two tuples.
18. **Convert a Tuple into a Dictionary** – Write a script that converts a tuple of key-value pairs into a dictionary.
19. **Find the Second Largest Number in a Tuple** – Write a program to find the second highest value in a tuple.
20. **Find the Difference Between Two Tuples** – Write a script that finds the elements that exist in one tuple but not in the other.

Set Exercises

1. **Create and Display a Set** – Write a Python program to create a set and print its elements.
2. **Check if an Element Exists in a Set** – Write a Python script to check whether a given element is present in a set.
3. **Add Elements to a Set** – Write a program that adds new elements to a set.
4. **Remove an Element from a Set** – Write a Python script that removes an element from a set using `remove()` and `discard()`.
5. **Find the Intersection of Two Sets** – Write a Python program to find the common elements between two sets.
6. **Find the Union of Two Sets** – Write a script that merges two sets into one.
7. **Find the Difference Between Two Sets** – Write a Python program to find elements that exist in one set but not in another.
8. **Find the Symmetric Difference Between Two Sets** – Write a Python script that finds elements that are in either of two sets but not in both.
9. **Convert a List into a Set to Remove Duplicates** – Write a Python program to convert a list into a set to remove duplicate values.
10. **Convert a Set into a List** – Write a script that converts a set into a list.

Dictionary Exercises

1. **Create and Display a Dictionary** – Write a Python program to create a dictionary with key-value pairs and print it.

2. **Access Elements in a Dictionary** – Write a script to retrieve a value from a dictionary using its key.
3. **Modify a Dictionary Entry** – Write a Python program to update the value of a specific key in a dictionary.
4. **Add a New Key-Value Pair to a Dictionary** – Write a script to insert a new entry into a dictionary.
5. **Remove an Element from a Dictionary** – Write a Python program to delete a key-value pair from a dictionary.
6. **Find the Maximum and Minimum Values in a Dictionary** – Write a script to determine the highest and lowest values stored in a dictionary.
7. **Find the Sum of Dictionary Values** – Write a Python program that calculates the sum of all numerical values in a dictionary.
8. **Check if a Key Exists in a Dictionary** – Write a script to verify whether a particular key exists in a dictionary.
9. **Merge Two Dictionaries** – Write a Python program that combines two dictionaries into one.
10. **Find the Key with the Highest Value** – Write a script to identify the key that has the highest numerical value in a dictionary.
11. **Convert a Dictionary into a List of Tuples** – Write a Python program to convert a dictionary into a list of `(key, value)` tuples.
12. **Convert a List of Tuples into a Dictionary** – Write a script that converts a list of `(key, value)` tuples into a dictionary.
13. **Sort a Dictionary by Key and Value** – Write a Python program to sort a dictionary by keys and values.
14. **Reverse the Keys and Values in a Dictionary** – Write a script that swaps the keys and values of a dictionary.

Assignment

1. Write a program to input electricity unit charges and calculate total electricity bill according to the given condition:
    a. For first 50 units Rs. 0.50/unit
    b. For next 100 units Rs. 0.75/unit
    c. For next 100 units Rs. 1.20/unit
    d. For unit above 250 Rs. 1.50/unit
    e. An additional surcharge of 20% is added to the bill
2. Write a program to input marks of five subjects Physics, Chemistry, Biology, Mathematics and Computer. Calculate percentage and grade according to following:
    a. Percentage > 90% : Grade A

    b. Percentage > 80% : Grade B
    c. Percentage > 70% : Grade C
    d. Percentage > 60% : Grade D
    e. Percentage > 40% : Grade E
    f. Percentage < 40% : Grade F

3. Write a program to enter any number and print it in words e.g. input: 101, output: One Zero Once.
4. Dice Rolling Simulator
    - Like the title suggests, this project involves writing a program that simulates rolling dice. When the program runs, it will randomly choose a number between 1 and 6.

Looping

1. Write a program to print table of any number.
2. Write a program which can compute the factorial of a given numbers.
3. Write a program to find sum of natural numbers.
4. Write a program to print all even numbers between 1 to 100.
5. Write a program to enter any number and calculate sum of its digits.
6. Write a program to enter any number and calculate product of its digits.
7. Write a program to enter any number and print reverse of that number.
8. Write a program to enter any number and check whether number is palindrome or not using for loop
9. Write a program to enter any number and check whether it is Armstrong number or not.
10. 371 is an Armstrong number since 3**3 + 7**3 + 1**3 = 371.
11. Write a program to print Fibonacci series up to n terms.
12. Fibonacci series is a series of numbers where the current number is the sum of previous two terms.
13. Write a program take a series of integer from user and sort it.
14. Write a program that loops through numbers from 1 to 10 and uses the `pass` statement when the number is 5.

Functions

1. Write a lambda function that takes a number and returns its square.
2. Write a lambda function that takes two numbers and returns the maximum of the two.
3. Write a function that takes a variable number of arguments and returns their sum.
4. Write a recursive function to compute the factorial of a given number.

File Handling Programs

1. Create a file called sfsp.txt. First add a new line to the file:Welcome to sfsp. and then print the content sfsp.txt.
2. Write a program to read a file and display it on the monitor.
3. Write a program to copy of a file.
4. Write an example that counts the number of times a particular character, such as e, appears in a file.
5. Write a program that counts the number of lines, characters and words in a text file.

Programming Exercise- 1 - Python Basic + if-else

1. **Basic Output:** Write a Python script that prints "Hello, World!" on the screen and then prints your name on a separate line.
2. **Sum Calculation:** Create a Python program that asks the user to input two numbers and then displays their sum.
3. **Division Operation:** Write a Python program that takes two numbers as input and calculates their division result. Ensure it handles division by zero properly.
4. **Multiplication of Two Numbers:** Develop a Python script that prompts the user for two numbers and displays their product.
5. **Basic Arithmetic Operations:** Write a Python program that accepts two numbers from the user and performs the following operations: addition, subtraction, multiplication, division, and modulus.
6. **Circle Measurements:** Implement a Python program that calculates and prints the area and circumference of a circle based on user-provided radius.

7. **Average Calculator:** Write a Python script that takes three numbers from the user and computes their average.
8. **Variable Swapping (Using Third Variable):** Create a Python program to swap two values using a temporary variable and display the results.
9. **Variable Swapping (Without Third Variable):** Modify the above program to swap two variables without using an additional variable.
10. **Check Python Installation:** Write a Python script that checks whether Python is installed on the system and prints the current version.
11. **Positive, Negative, or Zero:** Develop a Python program that asks the user for a number and prints whether it's positive, negative, or zero.
12. **Find the Largest Number:** Create a Python program that accepts three numbers and determines the largest among them.
13. **Days in a Month:** Write a Python program that takes a month number (1-12) as input and displays the corresponding number of days.
14. **Vowel or Consonant Identifier:** Develop a Python program that prompts the user for a single letter and determines if it's a vowel or consonant. If the input is not a valid letter, display an error message.
15. **Leap Year Checker:** Create a Python script that takes a year as input and checks if it's a leap year or not.
16. **Divisibility Check:** Write a Python program to determine whether a number is divisible by both 5 and 11.
17. **Even or Odd Number:** Develop a Python script that takes a number as input and determines whether it's even or odd.
18. **Student Grade Calculator:** Write a Python program that asks for the marks of five subjects (Physics, Chemistry, Biology, Mathematics, Computer Science), calculates the total percentage, and assigns a grade based on the result.
19. **Gross Salary Calculator:** Develop a Python script that computes an employee's gross salary based on the given salary brackets:
    - If basic salary ≤ 10,000: HRA = 20%, DA = 80%
    - If basic salary ≤ 20,000: HRA = 25%, DA = 90%
    - If basic salary > 20,000: HRA = 30%, DA = 95%
20. **Electricity Bill Generator:** Create a Python program to calculate the electricity bill based on the number of units consumed, following these tariff rules:
    - Up to 50 units: Rs. 0.50/unit
    - 51 to 200 units: Rs. 0.75/unit
    - 201 to 450 units: Rs. 1.20/unit
    - Above 450 units: Rs. 1.50/unit
    - A 20% surcharge is added to the final bill.
21. **Gross Salary Computation:** Write a Python program that determines an employee's gross salary based on the following conditions:
    - If the basic salary is **less than Rs. 1500** → HRA = 10%, DA = 90%
    - If the basic salary is **Rs. 1500 or more** → HRA = Rs. 500, DA = 98%
22. **Employee Salary Calculator:** Build a Python program to compute an employee's salary based on their **gender, years of service, and qualifications** using the conditions below:
    - **Male Employees:**

    - ≥ 10 years experience, Post-Graduate → Rs. 15,000
    - ≥ 10 years experience, Graduate → Rs. 10,000
    - < 10 years experience, Post-Graduate → Rs. 10,000
    - < 10 years experience, Graduate → Rs. 7,000
- **Female Employees:**
    - ≥ 10 years experience, Post-Graduate → Rs. 12,000
    - ≥ 10 years experience, Graduate → Rs. 9,000
    - < 10 years experience, Post-Graduate → Rs. 10,000
    - < 10 years experience, Graduate → Rs. 6,000

Programming Exercise- 2 - Basic Loops

1. **Print Numbers from 1 to 10**
   Write a Python program that prints the numbers from 1 to 10, each on a new line.
2. **Sum of First 10 Natural Numbers**
   Write a Python program to compute and display the sum of the first 10 natural numbers.
3. **Generate a Multiplication Table**
   Write a Python program that prompts the user to enter a positive integer and then prints the multiplication table for that number up to 10.
4. **Factorial Calculation**
   Write a Python program that asks the user to input a number and calculates its factorial without using built-in factorial functions.
5. **Exponentiation Without Using Built-in Functions**
   Write a Python script that takes two numbers as input (base and exponent) and computes the base raised to the power of the exponent **without using the `pow()` function**.
6. **Reverse the Digits of a Number**
   Write a Python program that takes an integer as input and outputs the number with its digits reversed.
7. **Sum of Even and Odd Numbers from a Given List**
   Write a Python program that takes a list of integers from the user, separates even and odd numbers, and displays the sum of each.
8. **Prime Number Checker**
   Write a Python program that asks the user for a number and determines whether it is prime or not.
9. **Find the HCF (GCD) of Two Numbers**
   Write a Python program that accepts two numbers and calculates their **Highest Common Factor (HCF)** using a loop-based approach (without `math.gcd()`).
10. **Repeat Addition Using a Loop**
    Write a Python program that asks the user to enter two numbers, adds them, and displays the sum. The program should repeat this process until the user decides to stop.
11. **Counting Positive, Negative, and Zero Values**
    Write a Python program that takes multiple numbers as input (one at a time) until the user

decides to stop. At the end, it should display the count of positive numbers, negative numbers, and zeroes entered.

12. **Finding the Smallest and Largest Number**
    Write a Python script that allows the user to input multiple numbers and, at the end, displays the smallest and largest numbers entered.
13. **Print a Square Pattern of Asterisks (*)**
    Write a Python program that prints a square of * symbols, where the number of rows and columns is defined by the user.
14. **Right-Angled Triangle Star Pattern**
    Write a Python program that prints a right-angled triangle pattern using * symbols based on user-defined height.
15. **Left-Aligned Right-Angled Triangle Pattern**
    Write a Python script to print a left-aligned triangle pattern of * symbols, where the number of rows is specified by the user.
16. **Pyramid Pattern with Asterisks**
    Write a Python program that prints a pyramid pattern of * symbols, where the number of rows is defined by the user.
17. **Number Pyramid Pattern**
    Write a Python program that prints a number pyramid pattern, where each row contains repeated digits corresponding to the row number.
18. **Palindrome Number Triangle**
    Write a Python script to print a triangle pattern of numbers that form a palindrome on each row.
19. **Print All Odd Numbers from 1 to 100**
    Write a Python program that prints all odd numbers between 1 and 100, separated by spaces.
20. **Sum of Digits of a Number**
    Write a Python program that prompts the user for an integer and calculates the sum of its digits.
21. **Find Numbers Between 100 and 200 Divisible by 9**
    Write a Python program that finds and prints all numbers between 100 and 200 that are divisible by 9 and also calculates their sum.
22. **Check if a Number is an Armstrong Number**
    Write a Python script that determines whether a given number is an Armstrong number (where the sum of its digits each raised to the power of the number of digits equals the original number).

Programming Exercise 3 Python String

1. **Concatenate Two Strings**
   Write a Python program that combines two string values and prints the resulting string.

2. **Retrieve a Character from a String at a Specific Index**
   Write a Python program that takes a string and an index as input and prints the character at the given index.
3. **Find Unicode Code Point of a Character at a Given Index**
   Write a Python script to extract and print the Unicode code point of a character at a specific position in a string.
4. **Count Unicode Code Points in a Specified Text Range**
   Write a Python program that calculates the number of Unicode characters in a specific section of a string.
5. **Lexicographically Compare Two Strings**
   Write a Python script that takes two strings as input and determines which one comes first in lexicographical order.
6. **Case-Insensitive String Comparison**
   Write a Python program to compare two strings lexicographically without considering uppercase or lowercase differences.
7. **Append One String to Another**
   Write a Python script that appends one string to another and prints the new combined string.
8. **Check if a String Contains a Certain Substring**
   Write a Python program that verifies whether a given string contains a specified sequence of characters.
9. **Compare a String with a Given Character Sequence**
   Write a Python script to check if a string matches a specific sequence of characters.
10. **Compare a String with a String Buffer (Using Python's String Methods)**
    Write a Python program that compares a string with another string stored in a different format (such as a mutable list or buffer).
11. **Check if a String Ends with Another String**
    Write a Python script to verify whether a given string ends with a particular substring.
12. **Compare Two String Objects for Equality**
    Write a Python program to check if two different string objects contain identical text.
13. **Convert a String into a Byte Array Representation**
    Write a Python script that converts a string into its byte representation and prints the result.
14. **Get the Canonical Representation of a String**
    Write a Python program that extracts the canonical form of a string and compares it with another string reference.
15. **Convert a String into a Character Array**
    Write a Python script that transforms a string into an array of individual characters.
16. **Convert All Characters in a String to Lowercase**
    Write a Python program that takes a string as input and converts all characters to lowercase.
17. **Convert All Characters in a String to Uppercase**
    Write a Python script that converts all letters in a string to uppercase.
18. **Find the Length of a String**
    Write a Python program that calculates and prints the length of a given string.

19. **Replace a Specific Character in a String**
    Write a Python script that replaces all instances of a particular character in a string with another character.
20. **Replace Substrings Matching a Regular Expression**
    Write a Python program that finds and replaces all vowels in a string with a specified character.
21. **Check if a String Starts with a Specific Substring**
    Write a Python script to determine whether a given string begins with a particular substring.
22. **Extract a Substring Between Two Given Indices**
    Write a Python program that takes a string and extracts a substring based on user-defined start and end positions.
23. **Trim Leading and Trailing Spaces in a String**
    Write a Python script that removes any extra whitespace from the beginning and end of a string.
24. **Duplicate Each Character in a String**
    Write a Python program that takes a string and creates a new string where every character is repeated twice.
25. **Calculate the Sum of All Digits in a String**
    Write a Python script that extracts numeric digits from a given string and calculates their sum.
26. **Count the Number of Words in a String**
    Write a Python program that takes a sentence as input and counts the total number of words.
27. **Swap Two Strings Using a Temporary Variable**
    Write a Python program that swaps the values of two strings using a third variable.
28. **Swap Two Strings Without Using a Third Variable**
    Write a Python script that swaps two string values without using an additional variable.
29. **Reverse Each Word in a String**
    Write a Python program that reverses every individual word in a given sentence while keeping the order of words intact.
30. **Search for a Word Within a String**
    Write a Python script that checks whether a specific word is present inside a given string.
31. **Find the First Non-Repeating Character in a String**
    Write a Python program that identifies and prints the first non-repeating character in a string.
32. **Remove Duplicate Characters from a String**
    Write a Python script that removes all duplicate characters from a given string, preserving only the first occurrence.
33. **Find the Most Frequently Occurring Character in a String**
    Write a Python program that determines which character appears most frequently in a string.
34. **Reverse the Order of Words in a Sentence**
    Write a Python script that takes a sentence as input and reverses the order of the words.

35. **Determine the Maximum of Two Strings Based on Lexicographical Order**
    Write a Python program that takes two strings and determines which one is greater based on dictionary order.
36. **Check if a String is a Palindrome**
    Write a Python script that verifies whether a given string reads the same forward and backward.
37. **Check if a String Contains the Letter 'x'**
    Write a Python program that checks whether the letter 'x' is present in a given string.
38. **Convert a String from Lowercase to Uppercase**
    Write a Python script that transforms a lowercase string into an uppercase string.
39. **Convert a String from Uppercase to Lowercase**
    Write a Python program that changes an uppercase string into lowercase.
40. **Count the Number of Uppercase and Lowercase Letters in a String**
    Write a Python script that calculates and displays the number of uppercase and lowercase letters in a string.
41. **Trim a Given String Using Python's `strip()` Method**
    Write a Python program that removes extra spaces at the beginning and end of a string.
42. **Replace a Specific Word in a String with Another Word**
    Write a Python script that replaces all occurrences of a specified word in a string with a different word.
43. **Convert Different Data Types to String Using `str()`**
    Write a Python program that converts an integer, a float, and a boolean into string format and prints them.
44. **Compare Strings Using Collation Rules**
    Write a Python script that compares two strings using case-insensitive and case-sensitive methods.
45. **Compare Strings Using `==`, `!=`, and `compare()` Functions**
    Write a Python program that compares two strings using different comparison techniques.
46. **Capitalize the First Letter of Each Word in a String**
    Write a Python script that takes a sentence and capitalizes the first letter of every word.
47. **Convert a List of Characters into a String**
    Write a Python program that converts a list of characters into a string.
48. **Concatenate Strings with Different Data Types**
    Write a Python script that concatenates a string with an integer, a float, and a boolean value.
49. **Check if Two Strings are Anagrams**
    Write a Python program that determines whether two given words are anagrams of each other.
50. **Tokenize a String Using Python's `split()` Method**
    Write a Python script that splits a string into individual words using space as a delimiter.

Programming Exercise 4 - Advanced Loop

1. **Sort a List in Ascending Order**
   Write a Python program that takes a list of numbers and sorts them in ascending order without using built-in sorting functions.
2. **Sort a List in Descending Order**
   Write a Python program that takes a list of numbers and sorts them in descending order without using built-in sorting functions.
3. **Calculate the Sum of List Elements**
   Write a Python script that takes a list of numbers and calculates the sum of all its elements.
4. **Compute the Average of List Elements**
   Write a Python program to compute the average of values stored in a list.
5. **Store and Display Elements of a List**
   Write a Python program that stores elements in a list and prints them one by one.
6. **User-Defined List Size and Input**
   Write a Python program that asks the user for the number of elements, then allows them to input values into a list and displays the list.
7. **Find the Sum of All Elements in a List**
   Write a Python program that calculates the sum of all numbers stored in a list.
8. **Print List Elements in Reverse Order**
   Write a Python script that takes n numbers as input from the user and prints them in reverse order.
9. **Print Cubes of All Elements in a List**
   Write a Python program that prints the cube of each number in a given list.
10. **Find the Maximum and Minimum Value in a List**
    Write a Python program that determines the maximum and minimum value from a list of numbers.
11. **Extract All Odd Numbers from a List**
    Write a Python script that filters and prints all odd numbers from a given list.
12. **Extract All Even Numbers from a List**
    Write a Python script that filters and prints all even numbers from a given list.
13. **Compute the Sum of Cubes of List Elements**
    Write a Python program that calculates the sum of the cube of all elements in a list.
14. **Calculate the Sum of Negative Numbers in a List**
    Write a Python program that extracts and sums all negative numbers from a given list.
15. **Search for an Element in a List**
    Write a Python script that takes a user-defined list and searches for a specific element in it.
16. **Remove Duplicate Elements from a List**
    Write a Python program that removes duplicate values from a given list while preserving the order.
17. **Find the Second Smallest Number in a List**
    Write a Python script that finds and displays the second smallest number in a list.