Python Coding Exercises:1

1. **The sum of Two Numbers**
   Write a Python program that asks the user to input two numbers, add them, and print the result.

2. **Exponentiation**
   Write a Python program that calculates 2^{20} and prints the result.

3. **Square Root Calculation**
   Write a Python program that calculates and prints the square root of a user-inputted number using math.sqrt() function.

4. **Random Number from a List**
   Create a list of five different integers. Write a Python program that randomly selects and prints an integer from the list using the random.choice() function.

5. **String Manipulation**
   Write a Python program that asks the user for a string and then:

   - Print the string in uppercase.
   - Prints the string with the first occurrence of a user-provided substring replaced with another substring.

6. **List Indexing**
   Create a list L = [15, 25, 35, 45, 55]. Write a Python program that:

   - Prints the first and last elements of the list.
   - Replace the third element with a new value provided by the user.

7. **List Slicing**
   Given the list L = [apple', 'banana', 'cherry', 'date', 'elderberry', 'fig'], write a Python program that prints the list's first three elements and last two elements.

8. **String Repetition**
   Write a Python program that takes a string input from the user and prints the string repeated 10 times.

9. **String Concatenation**
   Write a Python program that asks the user for two strings and then concatenates them. Print the resulting string.

10. **2D List Access**
    Given a 2D list M = [[10, 20, 30], [40, 50, 60], [70, 80, 90]], write a Python program that:

- Prints the entire second row.
- Prints the element at the last row and first column.

11. Column Sum Using List Comprehension

Given the matrix M = [[1, 2, 3], [4, 5, 6], [7, 8, 9]], use a list comprehension to compute the sum of the elements in the second column. Print the resulting sum.

12. Diagonal Product from a Matrix

Using the matrix M = [[2, 4, 6], [8, 10, 12], [14, 16, 18]], write a list comprehension to find the product of the diagonal elements (i.e., elements at positions (0,0), (1,1), and (2,2)). Print the resulting product.

13. Modify a String with List Comprehension

Write a Python program that uses list comprehension to take the string "python" and create a list where each character is repeated three times. For example, the string "python" should become ['ppp', 'yyy', 'ttt', 'hhh', 'ooo', 'nnn']. Print the resulting list.

14. Dictionary Values as Squares

Create a dictionary D = {'x': 2, 'y': 3, 'z': 4}. Write a program that uses dictionary comprehension to create a new dictionary where the keys are the same, but the values are the squares of the original values. Print the resulting dictionary.

15. Sort and Modify a Dictionary

Given the dictionary D = {'apple': 2, 'banana': 4, 'cherry': 6}, write a Python program to:

- Sort the dictionary keys in reverse alphabetical order.
- Create a new dictionary with these sorted keys where the values are multiplied by 10.
- Print the resulting dictionary.