**R.HENRY KOUSHAL [Machine Learning Lab-1]**

1.Write a program to count the number of vowels and consonants present in an input string.

def count\_vowels\_and\_consonants(s):

vowels = "aeiouAEIOU"

vowel\_count = 0

consonant\_count = 0

for char in s:

if char.isalpha():

if char in vowels:

vowel\_count += 1

else:

consonant\_count += 1

return vowel\_count, consonant\_count

input\_string = input("Enter the input string: ")

vowels, consonants = count\_vowels\_and\_consonants(input\_string)

print(f"Number of vowels: {vowels}")

print(f"Number of consonants: {consonants}")

**OUTPUT:** Enter the input string: apple

Number of vowels: 2

Number of consonants: 3

2. Write a program that accepts two matrices A and B as input and returns their product AB. Check if A & B are multipliable; if not, return error message.

import numpy as np

def input\_matrix(name):

rows = int(input(f"Enter the number of rows for matrix {name}: "))

cols = int(input(f"Enter the number of columns for matrix {name}: "))

print(f"Enter the elements of the matrix {name} row-wise:")

matrix = []

for i in range(rows):

row = list(map(float, input().split()))

matrix.append(row)

return np.array(matrix)

def multiply\_matrices(A, B):

if A.shape[1] != B.shape[0]:

return "Matrices cannot be multiplied"

return np.dot(A, B)

A = input\_matrix('A')

B = input\_matrix('B')

result = multiply\_matrices(A, B)

if isinstance(result, str):

print(result)

else:

print("The product of matrices A and B is:")

print(result)

**OUTPUT:** Enter the number of rows for matrix A: 2

Enter the number of columns for matrix A: 2

Enter the elements of the matrix A row-wise:

1 2

3 4

Enter the number of rows for matrix B: 2

Enter the number of columns for matrix B: 2

Enter the elements of the matrix B row-wise:

4 5

7 8

The product of matrices A and B is:

[[18. 21.]

[40. 47.]]

3. Write a program to find the number of common elements between two lists. The lists contain integers.

def find\_common\_elements(list1, list2)

set1 = set(list1)

set2 = set(list2)

common\_elements = set1 & set2

return len(common\_elements)

list1 = list(map(int, input("Enter the elements of the first list (space-separated): ").split()))

list2 = list(map(int, input("Enter the elements of the second list (space-separated): ").split()))

common\_count = find\_common\_elements(list1, list2)

print(f"The number of common elements between the two lists is: {common\_count}")

**OUTPUT:** Enter the elements of the first list (space-separated): 12 3 4 5

Enter the elements of the second list (space-separated): 6 7 4 2

The number of common elements between the two lists is: 1

4. Write a program that accepts a matrix as input and returns its transpose.

def input\_matrix():

rows = int(input("Enter the number of rows for the matrix: "))

cols = int(input("Enter the number of columns for the matrix: "))

print("Enter the elements of the matrix row-wise:")

matrix = []

for i in range(rows):

row = list(map(float, input().split()))

matrix.append(row)

return matrix

def transpose\_matrix(matrix):

transposed = [[matrix[j][i] for j in range(len(matrix))] for i in range(len(matrix[0]))]

return transposed

matrix = input\_matrix()

transposed = transpose\_matrix(matrix)

print("The transpose of the matrix is:")

for row in transposed:

print(" ".join(map(str, row)))

**OUTPUT:** Enter the number of rows for the matrix: 2

Enter the number of columns for the matrix: 2

Enter the elements of the matrix row-wise:

4 5

7 8

The transpose of the matrix is:

4.0 7.0

5.0 8.0