Machine Learning

Assessment-1

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Team Members

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Q1.Consider the given list as [2,7,4,1,3,6].Write a program to count pairs of elements with sum equal to 10.

Pseudo code and explanation:

1. Function find\_pairs\_with\_sum(arr, target\_sum):

a. Initialize an empty list pairs.

b. Loop through each element i in arr:

i. Loop through each element j in arr starting from i + 1:

- If arr[i] + arr[j] equals target\_sum:

- Append the pair (arr[i], arr[j]) to pairs.

c. Return pairs.

This function is set in order to iterate the given array (array arr) and to find a pair of elements, that collectively meet the desired target sum (target\_sum). It uses nested loops to check pairs of indices that make sums arriving at the target within the array. Pair that match the requirement is stored in a list and returned. In the main program this function is applied to detect pairs in the arr\_for\_pairs array that amount up to the target\_sum\_for\_pairs.

Q2.Write a program that takes a list of real numbersas input and returns the range(difference between minimum and maximum) of the list.Check for list being lessthan 3 elementsin whichcase return anerror message(Ex: “Range determination not possible”).Given a list[5,3,8,1,0,4],therange is 8(8-0).

Pseudo code and explanation:

2. Function calculate\_range(real\_numbers):

a. If the length of real\_numbers is less than 3:

- Return "Range determination not possible".

b. Return the difference between the maximum and minimum values in real\_numbers.

Function calculate\_range counts the minimum and maximum values from the list of real numbers (real\_numbers) that are subtracted from one another to count the range. It first verifies whether the length of the list is less than 3. If it is the case, then it outputs a message that the range determination is not feasible. Else, it compute and gives the range. In the main program this function is used on the real\_numbers\_list in order to detect and display the interval.

Q3.Write a program that accepts a square matrix A and a positive integer m as arguments and returns Am.

Pseudo code and explanation:

3. Function highest\_occurrence(input\_string):

a. Initialize an empty dictionary char\_count.

b. Loop through each character char in input\_string:

- If char is an alphabetical character:

- Increment the count of char in char\_count.

c. Find the character with the maximum count in char\_count.

d. Return the character and its count.

This function receives an input string ( input\_string ) and finds the most frequent character in the specified string. It employs a dictionary ( char\_count ) to count various alphabetic letters present in the string. The function subsequently identifies the character whose count is maximized by returning the character and count. In the main program mode this function is used to search and print the character that occurs most frequently in the input\_str.

Q4.Write a program to count the highest

occurringcharacter & its occurrence count in an inputstring. Consideronly alphabets. Ex: for “hippopotamus”as inputstring, the maximally occurring character is ‘p’& occurrence count is 3.

Pseudo code and explanation:

4. Function matrix\_power(matrix, power):

a. Initialize result\_matrix as a copy of matrix.

b. Repeat the following power - 1 times:

i. Multiply each element of result\_matrix by the corresponding element in the original matrix.

c. Return result\_matrix.

In the matrix\_power function, matrix is a square matrix taken to power power. This is attainable by its iterative matrix multiplication behavior such that the output of each multiplication step serves as the input for the next iteration. The last product is to raise the matrix to the power given. This function is used in the main program to raise the square\_matrix\_A to the power of power\_m and print the resultant matrix.