**TASK -2 Questions**

1. With a given integral number n, write a program to generate a dictionary that contains (i, i\*i) such that is an integral number between 1 and n (both included). and then the program should print the dictionary.

Suppose the following input is supplied to the program:

8

Then, the output should be:

{1: 1, 2: 4, 3: 9, 4: 16, 5: 25, 6: 36, 7: 49, 8: 64}

number = int(input("Enter a number: "))

numberDict = {}

for i in range(1, number+1):

    numberDict[i] = i\*i

print(numberDict)

Output:

Enter a number: 8

{1: 1, 2: 4, 3: 9, 4: 16, 5: 25, 6: 36, 7: 49, 8: 64}

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1. Define a class which has at least two methods:

getString: to get a string from console input

printString: to print the string in upper case.

class String():

    def \_\_init\_\_(self):

        self.str = ""

    def get\_String(self):

        self.str = input("Enter the name:")

    def print\_String(self):

        print(self.str.upper())

str = String()

str.get\_String()

str.print\_String()

# output:

# sangeet

# SANGEET

1. Write a program that computes the value of a+aa+aaa with a given digit as the value of a.

Suppose the following input is supplied to the program:

3

Then, the output should be:

369

digit=int(input("Enter digit:"))

num=input("enter a number:")

result=0

for i in range(1,digit+1):

  result= result + int(str(num\*i))

print(result)

# output:

# Enter digit:3

# enter a number:3

# 369

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1. Write the following:
   1. Program to Add Two Matrices
2. row=int(input("enter no of row:"))
3. col=int(input("enter no of col:"))
4. print("enter the elements of matrix1")
5. m1=[[int(input()) for i in range(col)] for j in range(row)]
6. print("m1:")
7. for i in range(row):
8. for j in range(col):
9. print(format(m1[i][j],"<3"),end="")
10. print()
11. print("enter the elements of matrix2")
12. m2=[[int(input()) for i in range(col)] for j in range(row)]
13. print("m1:")
14. for i in range(row):
15. for j in range(col):
16. print(format(m2[i][j],"<3"),end="")
17. print()
18. print("result:")
19. res=[[0 for i in range(col)] for j in range(row)]
20. for i in range(row):
21. for j in range(col):
22. res[i][j]=m1[i][j]+m2[i][j]
23. print(format(res[i][j],"<3"),end="")
24. print()
25. # Output:
26. # enter no of row:2
27. # enter no of col:2
28. # enter the elements of matrix1
29. # 1
30. # 2
31. # 3
32. # 4
33. # m1:
34. # 1  2
35. # 3  4
36. # enter the elements of matrix2
37. # 1
38. # 2
39. # 3
40. # 4
41. # m1:
42. # 1  2
43. # 3  4
44. # result:
45. # 2  4
46. # 6  8
    1. Program to Transpose a Matrix
47. p=int(input("enter no of row :"))
48. q=int(input("enter no of col :"))
49. print("enter the elements of matrix1")
50. m1=[[int(input()) for i in range(q)] for j in range(p)]
51. print("m1:")
52. for i in range(p):
53. for j in range(q):
54. print(format(m1[i][j],"<4"),end="")
55. res=[[0 for i in range(p)] for j in range(q)]
56. for i in range(q):
57. for j in range(p):
58. res[i][j]=m1[j][i]
59. print("result:")
60. for i in range(q):
61. for j in range(p):
62. print(format(res[i][j],"<4"), end="")
63. print()
65. # output:
66. # enter no of row :2
67. # enter no of col :2
68. # enter the elements of matrix1
69. # 1
70. # 2
71. # 3
72. # 4
73. # m1:
74. # 1   2   3   4
75. # result:
76. # 1   3   2   4
    1. Program to Multiply Two Matrices
77. p=int(input("enter no of row for matr1:"))
78. q=int(input("enter no of col for mat2:"))
79. n=int(input("enter no of col for matr1 /row no of matr2"))
80. print("enter the elements of matrix1")
81. m1=[[int(input()) for i in range(n)] for j in range(p)]
82. print("m1:")
83. for i in range(p):
84. for j in range(n):
85. print(format(m1[i][j],"<3"),end="")
86. print()
87. print("enter the elements of matrix2")
88. m2=[[int(input()) for i in range(q)] for j in range(n)]
89. print("m2:")
90. for i in range(q):
91. for j in range(n):
92. print(format(m2[i][j],"<3"),end="")
93. print()
94. res=[[0 for i in range(q)] for j in range(p)]
95. for i in range(p):
96. for j in range(q):
97. for k in range(n):
98. res[i][j]=res[i][j]+m1[i][k]+m2[k][j]
99. print("result:")
100. for i in range(p):
101. for j in range(q):
102. print(format(res[i][j],"<3"),end="")
103. print()
104. # output:
105. # enter no of row for matr1:2
106. # enter no of col for mat2:2
107. # enter no of col for matr1 /row no of matr22
108. # enter the elements of matrix1
109. # 1
110. # 2
111. # 3
112. # 4
113. # m1:
114. # 1  2
115. # 3  4
116. # enter the elements of matrix2
117. # 1
118. # 2
119. # 3
120. # 4
121. # m2:
122. # 1  2
123. # 3  4
124. # result:
125. # 7  9
126. # 11 13

**OUTPUT:**

5.Please write a program which count and print the numbers of each character in a string input by console.

Ex:aabc

o/p -> a:2,b:1,c:1

inputString = input("Enter a string: ").casefold()

tempStr = ''

for char in inputString:

    if char not in tempStr:

        print(char, ':',inputString.count(char))

        tempStr = tempStr+char

# output:

# Enter a string: sangeet

# s : 1

# a : 1

# n : 1

# g : 1

# e : 2

# t : 1

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6. You are required to write a program to sort the (name, age, height) tuples by ascending order where name is string, age and height are numbers. The tuples are input by console. The sort criteria is:

1: Sort based on name;

2: Then sort based on age;

3: Then sort by score.

The priority is that name > age > score.

If the following tuples are given as input to the program:

Tom,19,80

John,20,90

Jony,17,91

Jony,17,93

Json,21,85

Then, the output of the program should be:

[('John', '20', '90'), ('Jony', '17', '91'), ('Jony', '17', '93'), ('Json', '21', '85'), ('Tom', '19', '80')

from operator import itemgetter

list1 = []

while True:

    input\_list = input()

    if not input\_list:

        break

    list1.append(tuple(input\_list.split(",")))

print(sorted(list1, key=itemgetter(0,1,2)))

#output:

# Tom,19,80

# John,20,90

# Jony,17,91

# Jony,17,93

# Json,21,85

# [('John', '20', '90'), ('Jony', '17', '91'), ('Jony', '17', '93'), ('Json', '21', '85'), ('Tom', '19', '80')]

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1. We count 35 heads and 94 legs among the chickens and rabbits in a farm. How many rabbits and how many chickens do we have?

def solve(heads,legs):

    error\_msg="No solution"

    chicken\_count=0

    rabbit\_count=0

    ans=False

    for i in range(heads+1):

        j=heads-i

        if (2\*i)+(4\*j)==legs:

            chicken\_count=i

            rabbit\_count=j

            ans=True

            break

    if (ans==True):

        print(chicken\_count,rabbit\_count)

    else:

        print(error\_msg)

solve(50,150)

# output:

# 25 25

8.Given a set of non-overlapping intervals, insert a new interval into the intervals (merge if necessary).

You may assume that the intervals were initially sorted according to their start times.

Example 1:

Given intervals insert and merge [2,5] would result in [1,5],[6,9].

Example 2:

Given [1,2],[3,5],[6,7],[8,10],[12,16], insert and merge [4,9] would result in [1,2],[3,10],[12,16].

This is because the new interval [4,9] overlaps with [3,5],[6,7],[8,10].

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9. Given the array of strings A,you need to find the longest string S which is the prefix of ALL the strings in the array.

Longest common prefix for a pair of strings S1 and S2 is the longest string S which is the prefix of both S1 and S2.

For Example, longest common prefix of "abcdefgh" and "abcefgh" is "abc" :

Ex: ‘ab’,’ac’,’adf’,’abcd’ is ‘a’

def longestCommonPrefix(a):

    size = len(a)

    if (size == 0):

        return "Null"

    if (size == 1):

        return a[0]

    a = sorted(a)

    print(a)

    end = min(len(a[0]), len(a[size - 1]))

    i = 0

    while (i < end and a[0][i] == a[size - 1][i]):

        i += 1

    pre = a[0][0: i]

    return pre

if \_\_name\_\_ == "\_\_main\_\_":

    array = []

    while True:

        a = input()

        if not a:

            break

        array.append(a);

    print("The longest Common Prefix is :" ,longestCommonPrefix(array))

# output:

# abcs

# abc

# ab

# abcdef

# ['ab', 'abc', 'abcdef', 'abcs']

# The longest Common Prefix is : ab

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10.Given numRows = 5,.

Generate

A[C] in row R, sum up A’[C] and A’[C-1] from previous row R - 1

[

[1],

[1,1],

[1,2,1],

[1,3,3,1],

[1,4,6,4,1]]

import math

def combination(n, r):

    return int((math.factorial(n)) / ((math.factorial(r)) \* math.factorial(n - r)))

def for\_test(x, y):

    for y in range(x):

        return combination(x, y)

def pascals\_triangle(rows):

    result = []

    for count in range(rows):

        row = []

        for element in range(count + 1):

            row.append(combination(count, element))

        result.append(row)

    return result

for row in pascals\_triangle(3):

    print(row)

# output:

# [1]

# [1, 1]

# [1, 2, 1]

11. Given an array S of n integers, are there elements a, b, c, and d in S such that a + b + c + d = target? Find all unique quadruplets in the array which gives the sum of target.

Note:

Elements in a quadruplet (a, b, c, d) must be in non-descending order. (ie, a ≤ b ≤ c ≤ d)

The solution set must not contain duplicate quadruplets.

Example:

Given array S = {1 0 -1 0 -2 2}, and target = 0

A solution set is:

(-2, -1, 1, 2)

(-2, 0, 0, 2)

(-1, 0, 0, 1)

def quadTuple(A, target):

    A.sort()

    for i in range(len(A) - 3):

        for j in range(i + 1, len(A) - 2):

            k = target - (A[i] + A[j])

            low = j + 1

            high = len(A) - 1

            while low < high:

                if A[low] + A[high] < k:

                    low = low + 1

                elif A[low] + A[high] > k:

                    high = high - 1

                # quadruplet with a given sum found

                else:

                    print((A[i], A[j], A[low], A[high]))

                    (low, high) = (low + 1, high - 1)

A = [-2, 0, 1, 2, -1, 0]

target = 0

quadTuple(A, target)

12. Given an array A, of N integers A.

Return the highest product possible by multiplying 3 numbers from the array.

Input 1:

A = [1, 2, 3, 4]

Output 1:

24

Explanation 1:

2 \* 3 \* 4 = 24

Input 2:

A = [0, -1, 3, 100, 70, 50]

Output

350000

Explanation 2:

70 \* 50 \* 100 = 350000

def findTriplet(A):

    A.sort()

    n = len(A)

    if n <= 2:

        print("No triplet exists. The array has less than 3 elements.")

    if A[n - 1] \* A[n - 2] \* A[n - 3] > A[0] \* A[1] \* A[n - 1]:

        print("Triplet is", (A[n - 1], A[n - 2], A[n - 3]))

    else:

        print("Triplet is", (A[0], A[1], A[n - 1]))

if \_\_name\_\_ == '\_\_main\_\_':

    A = [-4, 1, -8, 9, 6]

    findTriplet(A)

#   output:

#     Triplet is (-8, -4, 9)

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13. Write a function that takes a list L and returns a sublist of size N of that list. Assume that the index is in a decreasing order.you cannot go frontwards

Ex: [1,2,3,4]

N = 3

Ans:

[4,3,2]

[4,3,1]

[3,2,1]

[4,2,1]

import random

def randomList(L,N):

    list = random.sample(L, N)

    list = sorted(list)

    return  list

if \_\_name\_\_ == '\_\_main\_\_':

    L=input("Enter the list:")

    N=int(input("Enter the number:"))

    sublist=randomList(L,N)

    print("Sub List={0}".format(sublist))

# output:

# Enter the list:1234

# Enter the number:3

# Sub List=['1', '2', '4']

14. There are two arrays

A = (1,2,3,4,5) the result should be

B = (120,60,40,30,24)

120 = 2\*3\*4\*5

60 = 1\*3\*4\*5

40 = 1\*2\*4\*5

30 = 1\*2\*3\*5

24 = 1\*2\*3\*4

def findProduct(A):

    # get length of the list

    n = len(A)

    # base case

    if n == 0:

        return

    # use two auxiliary lists

    left = [None] \* n

    right = [None] \* n

    # `left[i]` stores the product of all elements in sublist `A[0…i-1]`

    left[0] = 1

    for i in range(1, n):

        left[i] = A[i - 1] \* left[i - 1]

    # `right[i]` stores the product of all elements in sublist `A[i+1…n-1]`

    right[n - 1] = 1

    for j in reversed(range(n - 1)):

        right[j] = A[j + 1] \* right[j + 1]

    # replace each element with the product of its left and right sublist

    for i in range(n):

        A[i] = left[i] \* right[i]

if \_\_name\_\_ == '\_\_main\_\_':

    A = []

    n = int(input("Enter the list size "))

    for i in range(0, n):

        print("Enter number at index", i, )

        item = int(input())

        A.append(item)

    print("User list is ", A)

    findProduct(A)

    # print the modified list

    print(A)

# Output:

# Enter the list size 5

# Enter number at index 0

# 2

# Enter number at index 1

# 3

# Enter number at index 2

# 4

# Enter number at index 3

# 5

# Enter number at index 4

# 6

# User list is  [2, 3, 4, 5, 6]

# [360, 240, 180, 144, 120]

15. convert a decimal number to binary using recursion.

Ex: 3

Ans : 11

def decToBin(x):

    str=''

    if x > 1:

        decToBin(x//2)

    print (x%2, end='')

num=int(input("Enter a number:"))

decToBin(num)

#Output:

# Enter a number:3

# 11