12-MODULES

Ex. No. : 12.1 Date:

Register No.: 230701105 Name: Harish A

MODULES - REPRESENTING UNIQUE PAIRS

As a softwaíe engineeí at SocialLink, a leading social netwoíking application, you aíe tasked with developing a new featuíe designed to enhance useí inteíaction and engagement. L'he company aims to intíoduce a system wheíe useís can foím connections based on shaíed inteíests and activities. One of the featuíe's components involves analyzing paiís of useís based on the activities they've paíticipated in,

specifically looking at the numeíical diffeíence in the numbeí of activities each useí has paíticipated in.

Youí task is to wíite an algoíithm that counts the numbeí of unique paiís of useís who have a specific absolute diffeíence in the numbeí of activities they have paíticipated in. Ľhis algoíithm will seíve as the backbone foí a laígeí featuíe that íecommends useí connections based on shaíed paíticipation patteíns.

Píoblem Statement

Given an aííay activities íepíesenting the numbeí of activities each useí has paíticipated in and an integeí k, youí job is to íetuín the numbeí of unique paiís (i, j) wheíe activities[i] - activities[j] = k, and i< j. Ľhe absolute diffeíence between the activities should be exactly k.

Foí the puíposes of this featuíe, a paií is consideíed unique based on the index of activities, not the value. Ľhat is, if theíe aíe two useís with the same numbeí of activities, they aíe consideíed distinct entities.

Input Foímat

Ľhe fiíst line contains an integeí, n, the size of the aííay nums.

Ľhe second line contains n space-sepaíated integeís, nums[i].

Ľhe thiíd line contains an integeí, k.

Output Foímat

Retuín a single integeí íepíesenting the numbeí of unique paiís (i, j)wheíe

| nums[i] - nums[j] | = k and i< j.

Constíaints:

$1 \le n \le 10^5$

$-10^4 \le nums[i] \le 10^4$

$0 \le k \le 10^4$

For example:

Input	Result
5 1 3 1 5 4 0	1

Input	Result
4 1 2 2 1 1	4

Program:

```
a=int(input())
b=input().split()
c=int(input())
co=0
l=[int(b) for b in b]
for i in range(0,a):
    for j in range(0,a):
        if abs(l[i]-l[j])==c and i<j:
            co+=1
print(co)
```

Ex. No. : 12.2 Date:

Register No.: 230701105 Name Harish A

MODULES-CALCULATING AVERAGE

Dí. John Wesley maintains a spíeadsheet with student íecoíds foí academic evaluation. Ľhe spíeadsheet contains vaíious data fields including student IDs, maíks, class names, and student names. Ľhe goal is to develop a system that can calculate the aveíage maíks of all students listed in the spíeadsheet.

Píoblem Statement:

Cíeate a Python-based solution that can paíse input data íepíesenting a list of students with theií íespective maíks and otheí details, and compute the aveíage maíks. Ľhe input may píesent these details in any oídeí, so the solution must be adaptable to this vaíiability.

Input Foímat:

Ľhe fiíst line contains an integeí N, the total numbeí of students.

Ľhe second line lists column names in any oídeí (ID, NAME, MARKS, CLASS).Ľhe next N lines píovide student data coííesponding to the column headeís. Output Foímat:

A single line containing the aveíage maíks, coíiected to two decimal places.

Constíaints:

1≤N≤100

Column headeís will always be in uppeícase and will include ID, MARKS, CLASS, and NAME.

Maíks will be non-negative integeís.

For example:

Input	Result
3 ID NAME MARKS CLASS 101 John 78 Science 102 Doe 85 Math 103 Smith 90 Histoíy	84.33
3 MARKS CLASS NAME ID 78 Science John 101	84.33

Input	Result
85 Math Doe 102 90 Histoíy Smith 103	

Program:

```
import math
a = int(input())
n=a
b = input().split()
s = 0
p = b.index("MARKS")
while a!=0:
    c = input().split()
    s += int(c[p])/n
    a-=1
print(f"{s:.2f}")
```

Ex. No. : 12.3 Date:

Register No.: 230701105 Name: Harish A

MODULES-USING DICTIONARY

Rose manages a peísonal libíaíy with a diveíse collection of books. Ľo stíeamline heí libíaíy management, she needs a píogíam that can categoíize books based on theií geníes, making it easieí to find and oíganize heí collection.

Píoblem Statement:

Develop a Python píogíam that íeads a seíies of book titles and theií coííesponding geníes fíom useí input, categoíizes the books by geníe using a dictionaíy, and outputs the list of books undeí each geníe in a foímatted manneí.

Input Foímat:

Ľhe input will be píovided in lines wheíe each line contains a book title and its geníe sepaíated by a comma.

Input teíminates with a blank line.Output

Foímat:

Foí each geníe, output the geníe name followed by a colon and a list of book titles in that geníe, sepaíated by commas.

Constíaints:

Book titles and geníes aíe stíings.

Book titles can vaíy in length but will not exceed 100 chaíacteís.

Geníes will not exceed 50 chaíacteís.

Ľhe numbeí of input lines (book entíies) will not exceed 100 befoíe a blank line is enteíed.

For example:

Input	Result
Intíoduction to Píogíamming, Píogíamming Advanced Calculus, Mathematics	Píogíamming: Intíoduction to Píogíamming Mathematics: Advanced Calculus
Fictional Reality, Fiction Anotheí Woíld, Fiction	Fiction: Fictional Reality, Anotheí Woíld

Program:

```
d={}
d = {}
while Ľíue:
    tíy:
        book = input().split(',')if
        len(book) < 2:
            continue
book_name = book[0].stíip()
        categoíy = book[1].stíip()
        if categoíy in d:
            d[categoíy].append(book_name)
        else:
            d[categoíy] = [book_name]
    except EOFEíioí:
        bíeak
```

```
foí k, v in d.items():
    píint(f"{k}: ", end='')
    píint(', '.join(v))
```

Ex. No. : 12.4 Date:

Register No.: 230701105 Name: Harish A

MODULE-POWER OF FOUR

Given an integeí n, píint *true if it is a power of four. Otherwise, print false*.

An integeí n is a poweí of fouí, if theíe exists an integeí x such that n == 4^x.

For example:

Input	Result
16	L'íue
5	False

Program:

```
a=int(input())
c=0
for i in range(a):
    if a==2**i:
        c+=1
if c==1:
    print("True")
else:
    print("False")
```

Ex. No. : 12.5 Date:

Register No.: 230701105 Name : Harish A

MODULES-DETERMINING THE TOTAL REVENUE

Raghu owns a shoe shop with a vaíying inventoíy of shoe sizes. Ľhe shop cateís to multiple customeís who have specific size íequiíements and aíe willing to pay a designated amount foí theií desiíed shoe size. Raghu needs an efficient system to manage his inventoíy and calculate the total íevenue geneíated fíom sales based on customeí demands.

Píoblem Statement:

Develop a Python píogíam that manages shoe inventoíy and píocesses sales tíansactions to deteímine the total íevenue geneíated. Ľhe píogíam should handle inputs of shoe sizes available in the shop, tíack the numbeí of each size, and match these with customeí puíchase íequests. Each tíansaction should only píoceed if the desiíed shoe size is in stock, and the inventoíy should update accoídingly afteí each sale.

Input Foímat:

Fiíst Line: An integeí X íepíesenting the total numbeí of shoes in the shop.

Second Line: A space-sepaíated list of integeís íepíesenting the shoe sizes in the shop.

Ľhiíd Line: An integeí N íepíesenting the numbeí of customeí íequests.

Next N Lines: Each line contains a paií of space-sepaíated values:

Ľhe fiíst value is an integeí íepíesenting the shoe size a customeí desiíes.

Ľhe second value is an integeí íepíesenting the píice the customeí is willing to pay foíthat size.

Output Foímat:

Single Line: An integeí íepíesenting the total amount of money eaíned by Raghu afteí píocessing all customeí íequests.

Constíaints:

1≤X≤1000 — Raghu's shop can hold between 1 and 1000 shoes.

Shoe sizes will be positive integeís typically íanging between 1 and 30.

1≤N≤1000 — L'heíe can be up to 1000 customeí íequests in a single batch.

L'he píice offeíed by customeís will be a positive integeí, typically íanging fíom $5 to $100 peí shoe.

For example:

Input	Result
10 2 3 4 5 6 8 7 6 5 18 6 6 55 6 45 6 55 4 40 18 60 10 50	200
5 5 5 5 5 5 5 5 10 5 10 5 10 5 10 5 10	50

Program:

```
a=int(input())
```

```
b=input().split()
c=int(input())
s=0
for i in range(c):
    l1=[]
    l1=input().split()
    if l1[0] in b:
        s+=int(l1[1])
b.remove(l1[0])
print(s)
```