	Input	Expected	Got	
✔	5 8 9 12 15 3 11	Yes	Yes	✔
✔	6 2 9 21 32 43 43 1 4	No	No	✔
✔	6 13 42 31 4 8 9 17	Yes	Yes	✔

Ex. No. : 10.5 **Date: 01.06.24**

Register No.: 231901018 **Name: Kavin Sainath S**

Frequency of Elements

Tofindthefrequencyofnumbersina list anddisplayinsortedorder.

Constraints:

1< =n,arr[i]< =100

Input:

1687949068145

output:

12

42

51

682

791

901

For example:

Input	Result
435345	32 42 52

Program:

```
lst5=[int(x) for x in input().split(" ")]
lst=sorted(list(set(lst5)))
c=0
for i in lst:
    c=0
    for j in lst5:
        if(i==j):
            c=c+1
    print("%d %d"%(i,c))
```

	Input	Expected	Got	
✔	4 3 5 3 4 5	3 2 4 2 5 2	3 2 4 2 5 2	✔
✔	12 4 4 4 2 3 5	2 1 3 1 4 3 5 1 12 1	2 1 3 1 4 3 5 1 12 1	✔
✔	5 4 5 4 6 5 7 3	3 1 4 2 5 3 6 1 7 1	3 1 4 2 5 3 6 1 7 1	✔

11 - EXCEPTION HANDLING

Ex. No. : 11.1 **Date: 02.06.24**

Register No.: 231901018 **Name: Kavin Sainath S**

EXCEPTION HANDLING

Tofindwhetheradigitliesinthespecifiedrange(1-100).Handlingexceptionsforinvalidinputsand out-of-rangenumbers.

InputFormat:

Userinputsanumber.

OutputFormat:

Confirmtheinputorprintanerrormessageifit'sinvalidoroutofrange.

For example:

Input	Result
1	Validinput.
101	Error:Numberoutofallowedrange
rec	Error:invalidliteralforint()

Program:

```
try:
    a=input()
    if(int(a)>0 and int(a)<101):
        print("Valid input.")
    else:
        print("Error: Number out of allowed range")
```

except:

print("Error: invalid literal for int()")

	Input	Expected	Got	
✔	1	Valid input.	Valid input.	✔
✔	100	Valid input.	Valid input.	✔
✔	101	Error: Number out of allowed range	Error: Number out of allowed range	✔

Ex. No. : 11.2 **Date: 02.06.24**

Register No.: 231901018 **Name Kavin Sainath S**

EXCEPTION HANDLING

WriteaPythonprogramthatperformsdivisionandmodulooperationsontwonumbersprovided bytheuser.Handledivisionbyzeroandnon-numericinputs.

InputFormat:

Twolinesofinput,eachcontaininganumber.

OutputFormat:

Printtheresultofdivisionandmodulooperation,oranerrormessageifanexceptionoccurs.

For example:

Input	Result
10 2	Divisionresult:5.0 Moduloresult:0
7 3	Divisionresult:2.3333333333333335 Moduloresult:1
8 0	Error:Cannotdivideormodulobyzero.

Program:

```
try:
    a=input()
    b=input()
    c=int(a)/int(b)
    d=int(a)%int(b)
except ZeroDivisionError:
    print("Error: Cannot divide or modulo by zero.")
except:
    print("Error: Non-numeric input provided.")
else:
    print("Division result:",c)
    print("Modulo result:",d)
```

	Input	Expected	Got
✔	10 2	Division result: 5.0 Modulo result: 0	Division result: 5.0 Modulo result: 0
✔	7 3	Division result: 2.3333333333333335 Modulo result: 1	Division result: 2.3333333333333335 Modulo result: 1
✔	8 0	Error: Cannot divide or modulo by zero.	Error: Cannot divide or modulo by zero.
✔	abc 5	Error: Non-numeric input provided.	Error: Non-numeric input provided.

Ex. No. : 11.3 **Date: 02.06.24**

Register No.: 231901018 **Name: Kavin Sainath S**

EXCEPTION HANDLING

WriteaPythonprogramthataskstheuserfortheirageandprintsamessagebasedontheage.
Ensurethattheprogramhandlescaseswheretheinputisnotavalidinteger.

Input Format: Asinglelineinputrepresentingtheuser'sage.

Output Format: Printamessagebasedontheageoranerroriftheinputisinvalid.

For example:

Input	Result
twenty	Error:Pleaseenteravalidage.
25	Youare25yearsold.
-1	Error:Pleaseenteravalidage.

Program:

```
try:
    a=input()
    if int(a)>=0:
        print("You are",a,"years old.")
    else:
        print("Error: Please enter a valid age.")
except:
    print("Error: Please enter a valid age.")
```

	Input	Expected	Got	
✔	twenty	Error: Please enter a valid age.	Error: Please enter a valid age.	✔
✔	25	You are 25 years old.	You are 25 years old.	✔
✔	-1	Error: Please enter a valid age.	Error: Please enter a valid age.	✔
✔	150	You are 150 years old.	You are 150 years old.	✔
✔		Error: Please enter a valid age.	Error: Please enter a valid age.	✔

Ex. No. : 11.4 **Date: 02.06.24**

Register No.: 231901018 **Name: Kavin Sainath S**

EXCEPTION HANDLING

DevelopaPythonprogramthatsafelycalculatesthesquarerootofanumberprovidedbythe user.Handleexceptionsfornegativeinputsandnon-numericinputs.

InputFormat:

Userinputsanumber.

OutputFormat:

Printthesquarerootofthenumberoranerrormessageifanexceptionoccurs.

For example:

Input	Result
16	Thesquarerootof16.0is4.00
-4	Error:Cannotcalculatethesquarerootofanegativenumber.
rec	Error:couldnotconvertstringtofloat

Program:

```
import math
try:
    n=input()
    n=float(n)
    if n < 0:
        print("Error: Cannot calculate the square root of a negative number.")
    else:
        r= math.sqrt(n)
        print("The square root of {} is {:.2f}".format(n, r))
```

except ValueError:

print("Error: could not convert string to float")

	Input	Expected	Got	
✔	16	The square root of 16.0 is 4.00	The square root of 16.0 is 4.00	✔
✔	0	The square root of 0.0 is 0.00	The square root of 0.0 is 0.00	✔
✔	-4	Error: Cannot calculate the square root of a negative number.	Error: Cannot calculate the square root of a negative number.	✔

Ex. No. : 11.5 **Date: 02.06.24**

Register No.: 231901018 **Name: Kavin Sainath S**

EXCEPTION HANDLING

DevelopaPythonprogramthatsafelyperformsdivisionbetweentwonumbersprovidedby theuser.Handleexceptionslikedivisionbyzeroandnon-numericinputs.

Input Format: Twolinesofinput,eachcontaininganumber.

Output Format: Printtheresultofthedivisionoranerrormessageifanexceptionoccurs.

For example:

Input	Result
10 2	5.0
10 0	Error:Cannotdivideormodulobyzero.
ten 5	Error:Non-numericinputprovided.

Program:

```
try:
    a=input()
    b=input()
    c=float(a)/float(b)
except ZeroDivisionError:
    print("Error: Cannot divide or modulo by zero.")
```

except:

    print("Error: Non-numeric input provided.")

else:

    print(c)

	Input	Expected	Got	
✔	10 2	5.0	5.0	✔
✔	10 0	Error: Cannot divide or modulo by zero.	Error: Cannot divide or modulo by zero.	✔
✔	ten 5	Error: Non-numeric input provided.	Error: Non-numeric input provided.	✔

12-MODULES

Ex. No. : 12.1 **Date: 07.06.24**

Register No.: 231901018 **Name: Kavin Sainath S**

MODULES - REPRESENTING UNIQUE PAIRS

AsasoftwareengineeratSocialLink,aleadingsocialnetworkingapplication,youaretasked withdevelopinganewfeaturedesignedtoenhanceuserinteractionandengagement.The companyaimstointroduceasystemwhereuserscanformconnectionsbasedonshared interestsandactivities.Oneofthefeature'scomponentsinvolvesanalyzingpairsofusers basedontheactivitiesthey'veparticipatedin,specificallylookingatthenumericaldifference inthenumberofactivitieseachuserhasparticipatedin.

Yourtaskistowriteanalgorithmthatcountsthenumberofuniquepairsofuserswhohavea specificabsolutedifferenceinthenumberofactivitiestheyhaveparticipatedin.This algorithmwillserveasthebackboneforalargerfeaturethatrecommendsuserconnections basedonsharedparticipationpatterns.

ProblemStatement

Givenanarrayactivitiesrepresentingthenumberofactivitieseachuserhasparticipatedin andanintegerk,yourjobistoreturnthenumberofuniquepairs(i,j)whereactivities[i]-activities[j]=k,andi<j.Theabsolutedifferencebetweentheactivitiesshouldbeexactlyk.

Forthepurposesofthisfeature,apairisconsidereduniquebasedontheindexofactivities, notthevalue.Thatis,iftherearetwouserswiththesamenumberofactivities,theyare considereddistinctentities.

InputFormat

Thefirstlinecontainsaninteger,n,thesizeofthearraynums.

Thesecondlinecontainsnspace-separatedintegers,nums[i].

Thethirdlinecontainsaninteger,k.

OutputFormat

Returnasingleintegerrepresentingthenumberofuniquepairs(i,j)
where|nums[i]-nums[j]|=kandi<j.

Constraints:

$1 \leq n \leq 10^5$

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

$0 \leq k \leq 10^4$

For example:

Input	Result
5 13154 0	1
4 1221 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)
```

	Input	Expected	Got	
✔	4 1 2 3 4 1	3	3	✔
✔	5 1 3 1 5 4 0	1	1	✔
✔	4 1 2 2 1 1	4	4	✔

Ex. No. : 12.2 **Date: 07.06.24**

Register No.: 231901018 **Name Kavin Sainath S**

MODULES-CALCULATING AVERAGE

Dr.JohnWesleymaintainsaspreadsheetwithstudentrecordsforacademicevaluation.The spreadsheetcontainsvariousdatafieldsincludingstudentIDs,marks,classnames,and studentnames.Thegoalistodevelopasystemthatcancalculatetheaveragemarksofall studentslistedinthespreadsheet.

ProblemStatement:

CreateaPython-basedsolutionthatcanparseinputdatarepresentingalistofstudentswith theirrespectivemarksandotherdetails,andcomputetheaveragemarks.Theinputmay presentthesedetailsinanyorder,sothesolutionmustbeadaptabletothisvariability.

InputFormat:

ThefirstlinecontainsanintegerN,thetotalnumberofstudents.

Thesecondlinelistscolumnnamesinanyorder(ID,NAME,MARKS,CLASS).

ThenextNlinesprovidestudentdatacorrespondingtothecolumnheaders.

OutputFormat:

Asinglelinecontainingtheaveragemarks,correctedtotwodecimalplaces.

Constraints:

1≤N≤100

ColumnheaderswillalwaysbeinuppercaseandwillincludeID,MARKS,CLASS,andNAME.

Markswillbenon-negativeintegers.

For example:

Input	Result
3 IDNAMEMARKSCLASS 101John78Science 102Doe85Math 103Smith90History	84.33
3 MARKSCLASSNAMEID 78ScienceJohn101 85MathDoe102 90HistorySmith103	84.33

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}")
```

	Input	Expected	Got	
✔	3 ID NAME MARKS CLASS 101 John 78 Science 102 Doe 85 Math 103 Smith 90 History	84.33	84.33	✔
✔	3 MARKS CLASS NAME ID 78 Science John 101 85 Math Doe 102 90 History Smith 103	84.33	84.33	✔

Ex. No. : 12.3 **Date: 07.06.24**

Register No.: 231901018 **Name: Kavin Sainath S**

MODULES-USING DICTIONARY

Rosemanagesapersonallibrarywithadiversecollectionofbooks.Tostreamlineherlibrary management,sheneedsaprogramthatcancategorizebooksbasedontheirgenres,making iteasiertofindandorganizehercollection.

ProblemStatement:

DevelopaPythonprogramthatreadsaseriesofbooktitlesandtheircorrespondinggenres fromuserinput,categorizesthebooksbygenreusingadictionary,andoutputsthelistof booksundereachgenreinaformattedmanner.

InputFormat:

Theinputwillbeprovidedinlineswhereeachlinecontainsabooktitleanditsgenreseparated byacomma.

Inputterminateswithablankline.

OutputFormat:

Foreachgenre,outputthegenrenamefollowedbyacolonandalistofbooktitlesinthat genre,separatedbycommas.

Constraints:

Booktitlesandgenresarestrings.

Booktitlescanvaryinlengthbutwillnotexceed100characters.

Genreswillnotexceed50characters.

Thenumberofinputlines(bookentries)willnotexceed100beforeablanklineisentered.

For example:

Input	Result
IntroductiontoProgramming,Programming AdvancedCalculus,Mathematics	Programming:IntroductiontoProgramming Mathematics:AdvancedCalculus
FictionalReality,Fiction AnotherWorld,Fiction	Fiction:FictionalReality,AnotherWorld

Program:

```
d={}
d={}
whileTrue:
try:
book=input().split(',')
iflen(book)<2:
continue
book_name=book[0].strip()
category=book[1].strip()
ifcategoryind:
d[category].append(book_name)
else:
d[category]=[book_name]
exceptEOFError:
break

fork,vind.items():
print(f"{k}:",end='')
```

```
print(','.join(v))
```

	Input	Expected	Got	
✔	Introduction to Programming, Programming Advanced Calculus, Mathematics	Programming: Introduction to Programming Mathematics: Advanced Calculus	Programming: Introduction to Programming Mathematics: Advanced Calculus	✔
✔	Fictional Reality, Fiction Another World, Fiction	Fiction: Fictional Reality, Another World	Fiction: Fictional Reality, Another World	✔

Ex. No. : 12.4 **Date: 07.06.24**

Register No.: 231901018 **Name: Kavin Sainath S**

MODULE-POWER OF FOUR

Givenaninteger n,print *true if it is a power of four. Otherwise, print false*.

Aninteger n isapoweroffour,ifthereexistsaninteger x suchthat $n==4^x$.

For example:

Input	Result
16	True
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")
```

	Input	Expected	Got	
✔	1	True	True	✔
✔	16	True	True	✔
✔	8	False	False	✔
✔	256	True	True	✔
✔	1000	False	False	✔

Ex. No. : 12.5 **Date: 07.06.24**

Register No.: 231901018 **Name Kavin Sainath S**

MODULES-DETERMINING THE TOTAL REVENUE

Raghuownsashoeshopwithavaryinginventoryofshoesizes.Theshopcaterstomultiple customerswhohavespecificsizerequirementsandarewillingtopayadesignatedamount fortheirdesiredshoesize.Raghuneedsanefficientsystemtomanagehisinventoryand calculatethetotalrevenuegeneratedfromsalesbasedoncustomerdemands.

ProblemStatement:

DevelopaPythonprogramthatmanagesshoeinventoryandprocessessalestransactionsto determinethetotalrevenuegenerated.Theprogramshouldhandleinputsofshoesizes availableintheshop,trackthenumberofeachsize,andmatchthesewithcustomerpurchase requests.Eachtransactionshouldonlyproceedifthedesiredshoesizeisinstock,andthe inventoryshouldupdateaccordinglyaftereachsale.

InputFormat:

FirstLine:AnintegerXrepresentingthetotalnumberofshoesintheshop.

SecondLine:Aspace-separatedlistofintegersrepresentingtheshoesizesintheshop.

ThirdLine:AnintegerNrepresentingthenumberofcustomerrequests.

NextNLines:Eachlinecontainsapairofspace-separatedvalues:

Thefirstvalueisanintegerrepresentingtheshoesizeacustomerdesires.

Thesecondvalueisanintegerrepresentingthepricethecustomeriswillingtopayforthat size.

OutputFormat:

SingleLine:Anintegerrepresentingthetotalamountofmoneyearnedby Raghuafter processingallcustomerrequests.

Constraints:

1≤X≤1000—Raghu'sshopcanholdbetween1and1000shoes.

Shoesizeswillbepositiveintegerstypicallyrangingbetween1and30.

1≤N≤1000—Therecanbeupto1000customerrequestsinasinglebatch.

Thepriceofferedbycustomerswillbeapositiveinteger,typicallyrangingfrom$5to$100per shoe.

For example:

Input	Result
10 23456876518 6 655 645 655 440 1860 1050	200
5 55555 5 510 510 510 510 510	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)
```

	Input	Expected	Got	
✔	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	200	✔
✔	5 5 5 5 5 5 5 5 10 5 10 5 10 5 10 5 10	50	50	✔
✔	4 4 4 6 6 5 4 25 4 25 6 30 6 55 6 55	135	135	✔