

# RAJALAKSHMI ENGINEERING COLLEGE

RAJALAKSHMI NAGAR, THANDALAM – 602 105



**RAJALAKSHMI**  
**ENGINEERING COLLEGE**

**CS23221**  
**PYTHON PROGRAMMING LAB**

**Laboratory Observation Note Book**

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**Year/Branch/Section:** I / BTech.AI & DS / "C" \_\_\_\_\_

**Register No.:** 2116231801155 \_\_\_\_\_

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## **WEEK 1**



# **01 - Introduction to Python-Variables-Datatypes**

## **Input/Output-Formatting**

**Ex. No. : 1.1 Date: 12-3-24**

**Register No.: 231801155 Name: SARANYA V**

1. Write a program to convert strings to an integer and float and display its type.

Sample Input:

10

10.9

Sample Output:

10,<class 'int'>

10.9,<class 'float'>

**Program:**

```
a=input()
```

```
b=int(a)
```

```
d=input()
```

```
c=float(d)
```

```
print(b,type(b),sep=",")
```

```
print(format(c,'0.1f'),type(c),sep=",")
```

	Input	Expected	Got	
✓	10 10.9	10,<class 'int'> 10.9,<class 'float'>	10,<class 'int'> 10.9,<class 'float'>	✓
✓	12 12.5	12,<class 'int'> 12.5,<class 'float'>	12,<class 'int'> 12.5,<class 'float'>	✓
✓	89 7.56	89,<class 'int'> 7.6,<class 'float'>	89,<class 'int'> 7.6,<class 'float'>	✓
✓	55000 56.2	55000,<class 'int'> 56.2,<class 'float'>	55000,<class 'int'> 56.2,<class 'float'>	✓
✓	2541 2541.679	2541,<class 'int'> 2541.7,<class 'float'>	2541,<class 'int'> 2541.7,<class 'float'>	✓

**Ex. No. : 1.2**

**Date : 12-3-24**

**Register No.: 231801155**

**Name: SARANYA V**

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2. Ramesh's basic salary is input through the keyboard. His dearness allowance is 40% of his basic salary, and his house rent allowance is 20% of his basic salary. Write a program to calculate his gross salary.

Sample Input:

10000

Sample Output:

16000

**Program:**

```
bs=int(input())
```

```
da=0.4*bs
```

```
ra=0.2*bs
```

```
gs=bs+da+ra
```

```
print(int(gs))
```

**Output:**

	Input	Expected	Got	
✓	10000	16000	16000	✓
✓	20000	32000	32000	✓
✓	28000	44800	44800	✓
✓	5000	8000	8000	✓

**Ex. No. : 1.3**

**Date : 12-3-24**

**Register No.: 231801155**

**Name: SARANYA V**

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3. Write a simple python program to find the square root of a given floating point number. The output should be displayed with 3 decimal places.

Sample Input:

8.00

Sample Output:

2.828

**PROGRAM:**

```
import math
a=float(input())
b=math.sqrt(a)
print(format(b,'0.3f'))
```

**OUTPUT:**

	Input	Expected	Got	
✓	8.00	2.828	2.828	✓
✓	14.00	3.742	3.742	✓
✓	4.00	2.000	2.000	✓
✓	487	22.068	22.068	✓

**Ex. No. : 1.4****Date: 12-3-24****Register No.: 231801155****Name: SARANYA V**

4. Alfred buys an old scooter for Rs. X and spends Rs. Y on its repairs. If he sells the scooter for Rs. Z ( $Z > X + Y$ ). Write a program to help Alfred to find his gain percent. Get all the above-mentioned values through the keyboard and find the gain percent.

Input Format:

The first line contains the Rs X

The second line contains Rs Y

The third line contains Rs Z

Sample Input:

10000

250

15000

Sample Output:

46.34 is the gain percent.

**PROGRAM:**

```
X=int(input())
```

```
Y=int(input())
```

```
Z=int(input())
```

```
c=Z-(X+Y)
```

```
print(format((c*100)/(X+Y),'0.2f'),'is the gain percent.')
```

**OUTPUT:**

	Input	Expected	Got	
✓	10000 250 15000	46.34 is the gain percent.	46.34 is the gain percent.	✓
✓	45500 500 60000	30.43 is the gain percent.	30.43 is the gain percent.	✓
✓	5000 0 7000	40.00 is the gain percent.	40.00 is the gain percent.	✓
✓	12500 5000 18000	2.86 is the gain percent.	2.86 is the gain percent.	✓

**Ex. No. : 1.5**

**Date : 12-3-24**

**Register No.: 231801155**

**Name: SARANYA V**

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5. In many jurisdictions, a small deposit is added to drink containers to encourage people to recycle them. In one particular jurisdiction, drink containers holding one liter or less have a \$0.10 deposit and drink containers holding more than one liter have a \$0.25 deposit. Write a program that reads the number of containers of each size(less and more) from the user. Your program should continue by computing and displaying the refund that will be received for returning those containers. Format the output so that it includes a dollar sign and always displays exactly two decimal places.

Sample Input

10

20

Sample Output

Your total refund will be \$6.00.

**PROGRAM:**

```
less=int(input())
more=int(input())
l=less*0.10
m=more*0.25
print("Your total refund will be",end=" ")
print("$",format(l+m,'0.2f'),".",sep="")
```

**OUTPUT:**

	Input	Expected	Got	
✓	20 20	Your total refund will be \$7.00.	Your total refund will be \$7.00.	✓
✓	11 22	Your total refund will be \$6.60.	Your total refund will be \$6.60.	✓
✓	123 200	Your total refund will be \$62.30.	Your total refund will be \$62.30.	✓
✓	76 38	Your total refund will be \$17.10.	Your total refund will be \$17.10.	✓



**Ex. No. : 1.6**

**Date: 12-3-24**

**Register No.: 231801155**

**Name: SARANYA V**

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6. Justin is a carpenter who works on an hourly basis. He works in a company where he is paid Rs 50 for an hour on weekdays and Rs 80 for an hour on weekends. He works 10 hrs more on weekdays than weekends. If the salary paid for him is given, write a program to find the number of hours he has worked on weekdays and weekends.

**Hint:**

If the final result(hrs) are in -ve convert that to +ve using abs() function

The `abs()` function returns the absolute value of the given number.

```
number = -20
absolute_number = abs(number)
print(absolute_number)
# Output: 20
```

**Sample Input:**

450

**Sample Output:**

weekdays 10.38

weekend 0.38

**Program:**

```
salary=int(input())
b=(salary-500)/130
b=abs(b)
print("weekdays",(format(b+10,'0.2f')))
print("weekend",(format(b,'0.2f')))
```

**Output:**

	Input	Expected	Got	
✓	450	weekdays 10.38 weekend 0.38	weekdays 10.38 weekend 0.38	✓
✓	500	weekdays 10.00 weekend 0.00	weekdays 10.00 weekend 0.00	✓
✓	10000	weekdays 83.08 weekend 73.08	weekdays 83.08 weekend 73.08	✓
✓	6789	weekdays 58.38 weekend 48.38	weekdays 58.38 weekend 48.38	✓

## Week 2

Ex. No. : 2.1

Date : 6-4-24

Register No.: 231801155

Name: SARANYA V

1. Pretend that you have just opened a new savings account that earns 4 percent interest per year. The interest that you earn is paid at the end of the year, and is added to the balance of the savings account. Write a program that begins by reading the amount of money deposited into the account from the user. Then your program should compute and display the amount in the savings account after 1, 2, and 3 years. Display each amount so that it is rounded to 2 decimal places. Sample Input: 10000 Sample Output: Balance as of end of Year 1: \$10400.00. Balance as of end of Year 2: \$10816.00. Balance as of end of Year 3: \$11248.64.

**For example:**

Input	Result
10000	Balance as of end of Year 1: \$10400.00. Balance as of end of Year 2: \$10816.00. Balance as of end of Year 3: \$11248.64.

**Program:**

```
a=int(input())
b=a+(a*0.04)
print("Balance as of end of Year 1: $",format(b,"0.2f"),".",sep="")
c=b+(b*0.04)
print("Balance as of end of Year 2: $",format(c,"0.2f"),".",sep="")
d=c+(c*0.04)
print("Balance as of end of Year 3: $",format(d,"0.2f"),".",sep="")
```

**Output:**

	Input	Expected	Got
✓	10000	Balance as of end of Year 1: \$10400.00. Balance as of end of Year 2: \$10816.00. Balance as of end of Year 3: \$11248.64.	Balance as of end of Year 1: \$10400.00. Balance as of end of Year 2: \$10816.00. Balance as of end of Year 3: \$11248.64.
✓	20000	Balance as of end of Year 1: \$20800.00. Balance as of end of Year 2: \$21632.00. Balance as of end of Year 3: \$22497.28.	Balance as of end of Year 1: \$20800.00. Balance as of end of Year 2: \$21632.00. Balance as of end of Year 3: \$22497.28.

**Ex. No. : 2.2**

**Date: 6-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

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2. Mr.Ram has been given a problem kindly help him to solve it. The input of the program is either 0 or 1. IF 0 is the input he should display "C" if 1 is the input it should display "D".There is a constraint that Mr. Ram should use either logical operators or arithmetic operators to solve the problem, not anything else.

Hint:

Use ASCII values of C and D.

**Input Format:**

An integer x,  $0 \leq x \leq 1$ .

**Output Format:**

output a single character "C" or "D" depending on the value of x.

Input 1:

0

Output 1:

C

Input 2:

1

Output 1:

D

**For example:**

Input	Result
0	C

**Program:**

```
x=int(input())
```

```
if(x==0):
```

```
    print("C")
```

else:

```
print("D")
```

**Output:**

	Input	Expected	Got	
✓	0	C	C	✓
✓	1	D	D	✓

**Ex. No. : 2.3**

**Date : 6-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

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3. Write a program that returns the last digit of the given number. Last digit is being referred to the least significant digit i.e. the digit in the ones (units) place in the given number.

The last digit should be returned as a positive number.

For example,

if the given number is 197, the last digit is 7

if the given number is -197, the last digit is 7

**For example:**

Input	Result
197	7
-197	7

**Program:**

```
x=int(input())
```

```
x=abs(x)
```

```
z=x%10
```

```
print(z)
```

**Output:**

	Input	Expected	Got	
✓	197	7	7	✓
✓	-197	7	7	✓

**Ex. No. : 2.4** **Date : 6-4-24**

**Register No.: 231801155** **Name: SARANYA V**

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4. Note:

Dont use if-else. Operators alone must be used .

A team from the Rotract club had planned to conduct a rally to create awareness among the Coimbatore people to donate blood. They conducted the rally successfully. Many of the Coimbatore people realized it and came forward to donate their blood to nearby blood banks. The eligibility criteria for donating blood are people should be above or equal to 18 and his/ her weight should be above 40. There was a huge crowd and staff in the blood bank found it difficult to manage the crowd. So they decided to keep a system and ask the people to enter their age and weight in the system. If a person is eligible he/she will be allowed inside.

Write a program and feed it to the system to find whether a person is eligible or not.

Input Format:

Input consists of two integers that correspond to the age and weight of a person respectively.

Output Format:

Display True(IF ELIGIBLE)

Display False (if not eligible)

Sample Input

19

45

Sample Output

True

**For example:**

Input	Result
18 40	False

**Program:**

```

x=int(input())
y=int(input())
if((x>=18)and(y>40)):
    print("True")
else:
    print("False")

```

**Output:**

	Input	Expected	Got	
✓	19 45	True	True	✓
✓	18 40	False	False	✓
✓	18 42	True	True	✓
✓	16 45	False	False	✓



**Ex. No. : 2.5      Date :    6-4-24**

**Register No.: 231801155Name:    SARANYA V**

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**5.** Write a python program that takes a integer between 0 and 15 as input and displays the number of '1' s in its binary form.(Hint:use python bitwise operator.

Sample Input

3

Sample Output:

2

Explanation:

The binary representation of 3 is 011, hence there are 2 ones in it. so the output is 2.

**For example:**

Input	Result
3	2

**Program:**

```
num=int(input())
if 0<=num<=15:
    binary=bin(num)
    c=binary.count('1')
    print(c)
```

**Output:**

	Input	Expected	Got	
✓	3	2	2	✓
✓	5	2	2	✓
✓	15	4	4	✓

**Ex. No. : 2.6**

**Date: 6-4-24**

**Register No.: 231801155 Name: SARANYA V**

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6. The program that you create for this exercise will begin by reading the cost of a meal ordered at a restaurant from the user. Then your program will compute the tax and tip for the meal. Use your local tax rate (5 percent) when computing the amount of tax owing. Compute the tip as 18 percent of the meal amount (without the tax). The output from your program should include the tax amount, the tip amount, and the grand total for the meal including both the tax and the tip. Format the output so that all of the values are displayed using two decimal places.

Sample Input

100

Sample Output

The tax is 5.00 and the tip is 18.00, making the total 123.00

**For example:**

Input	Result
100	The tax is 5.00 and the tip is 18.00, making the total 123.00

**Program:**

```
c=int(input())
m=c*0.05
a=format(m,'0.02f')
n=c*0.18
b=format(n,'0.02f')
d=format(m+n+c,'0.02f')
print("The tax is ",a," and the tip is ",b," , making the total ",d,sep="")
```

**Output:**

	Input	Expected	Got
✓	100	The tax is 5.00 and the tip is 18.00, making the total 123.00	The tax is 5.00
✓	250	The tax is 12.50 and the tip is 45.00, making the total 307.50	The tax is 12.50

**Ex. No. : 2.7 Date: 6-4-24**

7. Mr. X's birthday is in next month. This time he is planning to invite N of his friends. He wants to distribute some chocolates to all of his friends after the party. He went to a shop to buy a packet of chocolates. At the chocolate shop, 4 packets are there with different numbers of chocolates. He wants to buy such a packet which contains a number of chocolates, which can be distributed equally among all of his friends. Help Mr. X to buy such a packet.

Input Given:

N-No of friends

P1,P2,P3 AND P4-No of chocolates

OUTPUT:

"True" if he can buy that packet and "False" if he can't buy that packet.

SAMPLE INPUT AND OUTPUT:

5

25

12

10

9

OUTPUT

True False True False

**For example:**

Input	Result
5	True False True True
25	
23	
20	
10	

*Program:*

```
n=int(input())
```

```
p1=int(input())
```

```
p2=int(input())
```

```
p3=int(input())
```

```
p4=int(input())
```

```

if(p1%n==0):
    print("True",end=" ")
else:
    print("False",end=" ")
if(p2%n==0):
    print("True",end=" ")
else:
    print("False",end=" ")
if(p3%n==0):
    print("True",end=" ")
else:
    print("False",end=" ")
if(p4%n==0):
    print("True",end=" ")
else:
    print("False",end=" ")

```

### Output:

	Input	Expected	Got	
✓	5 25 23 20 10	True False True True	True False True True	✓
✓	4 23 24 21 12	False True False True	False True False True	✓
✓	8 64 8 16 32	True True True True	True True True True	✓

**Ex. No. : 2.8      Date : 6-4-24**

**Register No.: 231801155 Name: SARANYA V**

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8. An online retailer sells two products: widgets and gizmos. Each widget weighs 75 grams. Each gizmo weighs 112 grams. Write a program that reads the number of widgets and the number of gizmos from the user. Then your program should compute and display the total weight of the parts.

Sample Input:

10

20

Sample Output:

The total weight of all these widgets and gizmos is 2990 grams.

**Program:**

```
w=int(input())
```

```
w=w*75
```

```
g=int(input())
```

```
g=g*112
```

```
tot=w+g
```

```
print("The total weight of all these widgets and gizmos is",tot,"grams.")
```

**output:**

	Input	Expected
✓	10 20	The total weight of all these widgets and gizmos is 2990 grams.

Got	
The total weight of all these widgets and gizmos is 2990 grams.	✓

**Ex. No. : 2.9** **Date : 6-4-24**

**Register No.: 231801155** **Name: SARANYA V**

9. In London, every year during Dasara there will be a very grand doll show. People try to invent new dolls of different varieties. The best-sold doll's creator will be awarded with a cash prize. So people broke their heads to create dolls innovatively. Knowing this competition, Mr.Lokpaul tried to create a doll that sings only when an even number is pressed and the number should not be zero and greater than 100.

IF Lokpaul wins print true, otherwise false.

Sample Input

10

Sample Output

True

Explanation:

Since 10 is an even number and a number between 0 and 100, True is printed

**For example:**

Input	Result
101	False

**Program:**

```

x=int(input())
if(x>0):
    if(x%2==0):
        print("True")
    else:
        print("False")
else:
    print("False")

```

**output:**

	Input	Expected	Got	
✓	56	True	True	✓
✓	101	False	False	✓
✓	-1	False	False	✓

**Ex. No. : 2.10**

**Date: 6-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

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10. In the 1800s, the battle of Troy was led by Hercules. He was a superstitious person. He believed that his crew can win the battle only if the total count of the weapons in hand is in multiple of 3 and the soldiers are in an even number of count. Given the total number of weapons and the soldier's count, Find whether the battle can be won or not according to Hercules's belief. If the battle can be won print True otherwise print False.

**Input format:**

Line 1 has the total number of weapons

Line 2 has the total number of Soldiers.

**Output Format:**

If the battle can be won print True otherwise print False.

Sample Input:

32

43

Sample Output:'

False

**For example:**

Input	Result
32 43	False

**Program:**

```
w=int(input())
```

```
s=int(input())
```

```
if(w%3==0 and s%2==0):
```

```
    print("True")
```

```
else:
```

```
    print("False")
```

**Output:**



	Input	Expected	Got	
✓	32 43	False	False	✓
✓	273 7890	True	True	✓
✓	800 4590	False	False	✓
✓	6789 32996	True	True	✓

## Week-3

**Ex. No. : 3.1**

**Date: 12-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

1. Write a program that returns the second last digit of the given number. Second last digit is being referred to the digit in the tens place in the given number.

For example, if the given number is 197, the second last digit is 9.

Note1 - The second last digit should be returned as a positive number. i.e. if the given number is -197, the second last digit is 9.

Note2 - If the given number is a single digit number, then the second last digit does not exist. In such cases, the program should return -1. i.e. if the given number is 5, the second last digit should be returned as -1

**For example:**

Input	Result
197	9
5	-1

**Program:**

```
x=int(input())
x=abs(x)
if(x>=10):
    a=x//10
    x=a%10
    print(x)
else:
    print("-1")
```

**Output:**

	Input	Expected	Got	
✓	197	9	9	✓
✓	-197	9	9	✓
✓	5	-1	-1	✓
✓	123456	5	5	✓
✓	8	-1	-1	✓

**Ex. No. : 3.2**

**Date: 12-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

2. A triangle can be classified based on the lengths of its sides as equilateral, isosceles or scalene. All three sides of an equilateral triangle have the same length. An isosceles triangle has two sides that are the same length, and a third side that is a different length. If all of the sides have different lengths then the triangle is scalene.

Write a program that reads the lengths of the three sides of a triangle from the user. Then display a message that states the triangle's type.

Sample Input 1

60

60

60

Sample Output 1

That's a equilateral triangle

Sample Input 2

40

40

80

Sample Output 2

That's a isosceles triangle

Sample Input 3

50

60

70

Sample Output 3

That's a scalene triangle

**For example:**

Input	Result
60 60 60	That's a equilateral triangle

Input	Result
60	
40 40 80	That's a isosceles triangle

### Program:

```

s1=int(input())
s2=int(input())
s3=int(input())
if(s1==s2==s3):
    print("That's a equilateral triangle")
elif(s1==s2!=s3):
    print("That's a isosceles triangle")
else:
    print("That's a scalene triangle")

```

### Output:

	Input	Expected	Got	
✓	60 60 60	That's a equilateral triangle	That's a equilateral triangle	✓
✓	40 40 80	That's a isosceles triangle	That's a isosceles triangle	✓
✓	50 60 70	That's a scalene triangle	That's a scalene triangle	✓
✓	50 50 80	That's a isosceles triangle	That's a isosceles triangle	✓
✓	10 10 10	That's a equilateral triangle	That's a equilateral triangle	✓

**Ex. No. : 3.3**

**Date: 12-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

### 3. IN / OUT

Ms. Sita, the faculty handling programming lab for you is very strict. Your seniors have told you that she will not allow you to enter the week's lab if you have not completed atleast half the number of problems given last week. Many of you didn't understand this statement and so they requested the good programmers from your batch to write a program to find whether a student will be allowed into a week's lab given the number of problems given last week and the number of problems solved by the student in that week.

Input Format:

Input consists of 2 integers.

The first integer corresponds to the number of problems given and the second integer corresponds to the number of problems solved.

Output Format:

Output consists of the string "IN" or "OUT".

Sample Input and Output:

Input

8

3

Output

OUT

**For example:**

Input	Result
8 3	OUT

**Program:**

```
given=int(input())
solved=int(input())
s=solved
g=given//2
if(s>=g):
    print("IN")
else:
    print("OUT")
```

**Output:**

	Input	Expected	Got	
✓	8 3	OUT	OUT	✓
✓	8 5	IN	IN	✓
✓	20 9	OUT	OUT	✓
✓	50 31	IN	IN	✓

**Ex. No. : 3.4** **Date: 12-4-24**



4. Write a program to calculate and print the Electricity bill where the unit consumed by the user is given from test case. It prints the total amount the customer has to pay. The charge are as follows:

Unit	Charge / Unit
Upto 199	@1.20
200 and above but less than 400	@1.50
400 and above but less than 600	@1.80
600 and above	@2.00

If bill exceeds Rs.400 then a surcharge of 15% will be charged and the minimum bill should be of Rs.100/-

Sample Test Cases

Test Case 1

Input

50

Output

100.00

Test Case 2

Input

300

Output

517.50

**For example:**

Input	Result
100.00	120.00

**Program:**

```
a=float(input())
```

```
if(a<200 and (a*1.20)<100):
```

```
    print(format(100,'0.2f'))
```

```
elif(a<200 and (a*1.20)>100):
```

```

print(format(a*1.20,'0.2f'))
elif(a>=200 and (a*1.50)<400) and a<400:
    print(format(a*1.50,'0.2f'))
elif(a>=200 and a<400 and (a*1.50)>400):
    print(format(a*1.50+(a*1.50*0.15),'0.2f'))
elif(a>=400 and a<600):
    print(format((a*1.80)+(a*1.80*0.15),'0.2f'))
elif(a>=600):
    print(format((a*2.00)+(a*2.00*0.15),'0.2f'))

```

### Output:

	Input	Expected	Got	
✓	50	100.00	100.00	✓
✓	100.00	120.00	120.00	✓
✓	500	1035.00	1035.00	✓
✓	700	1610.00	1610.00	✓

**Ex. No. : 3.5**

**Date: 12-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

5. The Chinese zodiac assigns animals to years in a 12 year cycle. One 12 year cycle is shown in the table below. The pattern repeats from there, with 2012 being another year of the dragon, and 1999 being another year of the hare.

Year Animal

2000 Dragon

2001 Snake

2002 Horse

2003 Sheep

2004 Monkey

2005 Rooster

2006 Dog

2007 Pig

2008 Rat

2009 Ox

2010 Tiger

2011 Hare

Write a program that reads a year from the user and displays the animal associated with that year. Your program should work correctly for any year greater than or equal to zero, not just the ones listed in the table.

Sample Input 1

2010

Sample Output 1

2010 is the year of the Tiger.

Sample Input 2

2020

Sample Output 2

2020 is the year of the Rat.

**Program:**

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

```
b=a%12
```

```
c=["Monkey","Rooster","Dog","Pig","Rat","Ox","Tiger","Hare","Dragon","Snake","Horse","Sheep"]
```

```
print(a,"is the year of the",c[b],end=".")
```

**Output:**

	Input	Expected	Got	
✓	2010	2010 is the year of the Tiger.	2010 is the year of the Tiger.	✓
✓	2020	2020 is the year of the Rat.	2020 is the year of the Rat.	✓

**Ex. No. : 3.6**

**Date: 12-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

6. Most years have 365 days. However, the time required for the Earth to orbit the Sun is actually slightly more than that. As a result, an extra day, February 29, is included in some years to correct for this difference. Such years are referred to as leap years. The rules for determining whether or not a year is a leap year follow:

- Any year that is divisible by 400 is a leap year.
- Of the remaining years, any year that is divisible by 100 is not a leap year.
- Of the remaining years, any year that is divisible by 4 is a leap year.
- All other years are not leap years.

Write a program that reads a year from the user and displays a message indicating whether or not it is a leap year.

Sample Input 1

1900

Sample Output 1

1900 is not a leap year.

Sample Input 2

2000

Sample Output 2

2000 is a leap year.

**Program:**

```
y=int(input())
if(y%400==0):
    print(y,"is a leap year.")
else:
    print(y,"is not a leap year.")
```

**Output:**

	Input	Expected	Got	
✓	1900	1900 is not a leap year.	1900 is not a leap year.	✓
✓	2000	2000 is a leap year.	2000 is a leap year.	✓
✓	2100	2100 is not a leap year.	2100 is not a leap year.	✓
✓	2400	2400 is a leap year.	2400 is a leap year.	✓

**Ex. No. : 3.7**

**Date: 12-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

7. The length of a month varies from 28 to 31 days. In this exercise you will create a program that reads the name of a month from the user as a string. Then your program should display the number of days in that month. Display "28 or 29 days" for February so that leap years are addressed.

Sample Input 1

February

Sample Output 1

February has 28 or 29 days in it.

Sample Input 2

March

Sample Output 2

March has 31 days in it.

Sample Input 3

April

Sample Output 3

April has 30 days in it.

**For example:**

Input	Result
February	February has 28 or 29 days in it.

**Program:**

```
a=input()
b=["January","March","May","July","August","October","December"]
c=["April","June","September","November"]
d=["February"]
if a in b:
    print(a,"has 31 days in it.")
elif a in c:
    print(a,"has 30 days in it.")
elif a in d:
```

```
print(a,"has 28 or 29 days in it.")
```

**Output:**

	Input	Expected	Got	
✓	February	February has 28 or 29 days in it.	February has 28 or 29 days in it.	✓
✓	March	March has 31 days in it.	March has 31 days in it.	✓
✓	April	April has 30 days in it.	April has 30 days in it.	✓
✓	May	May has 31 days in it.	May has 31 days in it.	✓



**Ex. No. : 3.8**

**Date: 12-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

8. Write a program to find the eligibility of admission for a professional course based on the following criteria:

Marks in Maths  $\geq 65$

Marks in Physics  $\geq 55$

Marks in Chemistry  $\geq 50$

Or

Total in all three subjects  $\geq 180$

Sample Test Cases

Test Case 1

Input

70

60

80

Output

The candidate is eligible

Test Case 2

Input

50

80

80

Output

The candidate is eligible

Test Case 3

Input

50

60

40

Output

The candidate is not eligible

**For example:**

Input	Result
70 60 80	The candidate is eligible

**Program:**

```
m=int(input())
```

```
p=int(input())
```

```
c=int(input())
```

```
if(m>=65 and p>=55 and c>=50) or ((m+p+c)>180):
```

```
    print("The candidate is eligible")
```

```
else:
```

```
    print("The candidate is not eligible")
```

**Output:**

	Input	Expected	Got	
✓	70 60 80	The candidate is eligible	The candidate is eligible	✓
✓	50 80 80	The candidate is eligible	The candidate is eligible	✓
✓	50 60 40	The candidate is not eligible	The candidate is not eligible	✓
✓	20 10 25	The candidate is not eligible	The candidate is not eligible	✓

**Ex. No. : 3.9**

**Date: 12-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

9. Three numbers form a Pythagorean triple if the sum of squares of two numbers is equal to the square of the third.

For example, 3, 4 and 5 form a Pythagorean triple, since  $3^2 + 4^2 = 25 = 5^2$

You are given three integers, a, b, and c. They need not be given in increasing order. If they form a Pythagorean triple, then print "yes", otherwise, print "no". Please note that the output message is in small letters.

Sample Input

3

5

4

Sample Output

yes

Sample Test Cases

Test Case 1

Input

3

5

4

Output

yes

Test Case 2

Input

5

8

2

Output

no

**Program:**

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

```
b=int(input())
```

```

c=int(input())
if( a*a+b*b==c*c or a*a+c*c==b*b or b*b+c*c==a*a):
    print("yes")
else:
    print("no")

```

**Output:**

	Input	Expected	Got	
✓	3 5 4	yes	yes	✓
✓	5 8 2	no	no	✓

**Ex. No. : 3.10**

**Date: 12-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

10. In this exercise you will create a program that reads a letter of the alphabet from the user. If the user enters a, e, i, o or u then your program should display a message indicating that the entered letter is a vowel. If the user enters y then your program should display a message indicating that sometimes y is a vowel, and sometimes y is a consonant. Otherwise your program should display a message indicating that the letter is a consonant.

Sample Input 1

i

Sample Output 1

It's a vowel.

Sample Input 2

y

Sample Output 2

Sometimes it's a vowel... Sometimes it's a consonant.

Sample Input3

c

Sample Output 3

It's a consonant.

**For example:**

Input	Result
y	Sometimes it's a vowel... Sometimes it's a consonant.
c	It's a consonant.

**Program:**

```
a=input()
if(a=='a' or a=='e' or a=='i' or a=='o' or a=='u'):
    print("It's a vowel.")
elif(a=='y'):
    print("Sometimes it's a vowel... Sometimes it's a consonant.")
else:
```

```
print("It's a consonant.")
```

**Output:**

	Input	Expected
✓	i	It's a vowel.
✓	y	Sometimes it's a vowel... Sometimes it's a consonant.
✓	c	It's a consonant.
✓	e	It's a vowel.
✓	r	It's a consonant.

Got	
It's a vowel.	✓
Sometimes it's a vowel... Sometimes it's a consonant.	✓
It's a consonant.	✓
It's a vowel.	✓
It's a consonant.	✓

## Week-4

**Ex. No. : 4.1**

**Date: 13-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

In mathematics, the factorial of a non-negative integer  $n$ , denoted by  $n!$ , is the product of all positive integers less than or equal to  $n$ . For example,

$$5! = 5 * 4 * 3 * 2 * 1 = 120$$

$$4! = 4 * 3 * 2 * 1 = 24$$

$$9! = 9 * 8 * 7 * 6 * 5 * 4 * 3 * 2 * 1 = 362880$$

Write a program to find the factorial of a given number.

The given number will be passed to the program as an input of type int.

The program is expected to calculate the factorial of the given number and return it as an int type.

Assumptions for this program:

The given input number will always be greater than or equal to 1.

Due to the range supported by int. the input numbers will range from 1 to 12.

**For example:**

Input	Result
5	120
4	24
9	362880

**Program:**

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

```
s=1
```

```
for i in range(1,a+1):
```

```
    s=s*i
```

```
print(s)
```

**Output:**

	Input	Expected	Got	
✓	5	120	120	✓
✓	4	24	24	✓
✓	9	362880	362880	✓





**Ex. No. : 4.2**

**Date: 13-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

2. Rakesh loves playing with numbers. He took the Fibonacci series and wants to find the sum of squares of the series until a given value. Write a code that implements his task.

Input Format:

Single Integer N

Output Format:

Display the sum of squares of the Fibonacci series until the Nth term.

Example Input: 9

Output: 1870

Explanation:

The numbers are: 1 1 2 3 5 8 13 21 34

Sum of their squares is:  $1 + 1 + 4 + 9 + 25 + 64 + 169 + 441 + 1156$  1870

For example:

Input

9

Result

1870

**Program:**

```
n=int(input())
```

```
a, b = 0, 1
```

```
s = 0
```

```
for i in range(n):
```

```
    s = s + (b **2)
```

```
    a, b=b, a+b
```

```
print(s)
```

**Output:**

	Input	Expected	Got	
✓	9	1870	1870	✓

**Ex. No. : 1.4**

**Date: 13-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

3. An abundant number is a number for which the sum of its proper divisors is greater than the number itself.

Proper divisors of the number are those that are strictly lesser than the number.

Input Format:

Take input an integer from stdin

Output Format:

Print Yes if given number is Abundant. Otherwise, print No

Example input:

12

Output:

Yes

Explanation

The proper divisors of 12 are: 1, 2, 3, 4, 6, whose sum is  $1 + 2 + 3 + 4 + 6 = 16$ . Since sum of proper divisors is greater than the given number, 12 is an abundant number.

Example input:

13

Output:

No

Explanation

The proper divisors of 13 is: 1, whose sum is 1. Since sum of proper divisors is not greater than the given number, 13 is not an abundant number.

**Program:**

```
n=int(input())
```

```
s=0
```

```
for i in range(1,n):
```

```
    if (n%i==0):
```

```
        s=s+i
```

```
if (s>n):  
    print("Yes")  
else:  
    print("No")
```

**Output:**

	Input	Expected	Got	
✓	12	Yes	Yes	✓
✓	13	No	No	✓

**Ex. No. : 4.4**

**Date: 13-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

4. Write a program to find the sum of the series  $1 + 11 + 111 + 1111 + \dots + n$  terms (n will be given as input from the user and sum will be the output)

Sample Test Cases

Test Case 1

Input

4

Output

1234

Test Case 2

Input

6

Output

123456

**Program:**

```
N=int(input())
```

```
Term=1
```

```
Series=0
```

```
for i in range(N):
```

```
    Series+=Term
```

```
    Term=Term*10+1
```

```
Print(Series)
```

**Output:**

	Input	Expected	Got	
✓	4	1234	1234	✓
✓	6	123456	123456	✓

**Ex. No. : 4.5**

**Date: 13-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

**5.** Given an integer N, check whether N the given number can be made a perfect square after adding to it.

Input Format:

Single integer input.

Output Format:

Yes or No.

Example Input:

24

Output:

Yes

Example Input:

26

Output:

No

**Program:**

```
import math
n=int(input())
x=n+1
z=math.sqrt(x)
if (z==int(z)):
    print("Yes")
else:
    print("No")
```

**Output:**

	Input	Expected	Got	
✓	24	Yes	Yes	✓
✓	26	No	No	✓



**Ex. No. : 4.6**

**Date: 13-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

6. Write a program that finds whether the given number N is Prime or not. If the number is prime, the program should return 2 else it must return 1.

Assumption:  $2 \leq N \leq 5000$ , where N is the given number.

Example 1: if the given number N is 7, the method must return 2

Example 2: if the given number N is 10, the method must return 1

**For example:**

Input	Result
7	2
10	1

**Program:**

```
n=int(input())
a=0
if(2<=n<=5000):
    for i in range(1,n+1):
        if(n%i==0):
            a+=1
else:
    result=1
if(a<=2):
    result=2
else:
    result=1
print(result)
```

**Output:**



	Input	Expected	Got	
✓	7	2	2	✓
✓	10	1	1	✓

**Ex. No. : 4.7**

**Date: 13-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

7. Write a program to return the nth number in the fibonacci series.

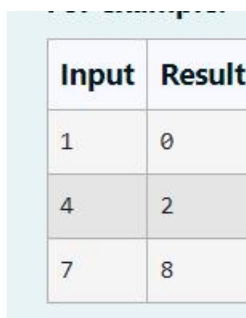
The value of N will be passed to the program as input.

NOTE: Fibonacci series looks like -

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55,... and so on.

i.e. Fibonacci series starts with 0 and 1, and continues generating the next number as the sum of the previous two numbers.

- first Fibonacci number is 0,
- second Fibonacci number is 1,
- third Fibonacci number is 1,
- fourth Fibonacci number is 2,
- fifth Fibonacci number is 3,
- sixth Fibonacci number is 5,
- seventh Fibonacci number is 8, and so on.



Input	Result
1	0
4	2
7	8

**Program:**

```
n=int(input())
a,b=0,1
for i in range(n-1):
    a,b=b,a+b
print(a)
```

**Output:**

	Input	Expected	Got	
✓	1	0	0	✓
✓	4	2	2	✓
✓	7	8	8	✓

**Ex. No. : 4.8**

**Date: 13-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

**8.** A Number is said to be Disarium number when the sum of its digit raised to the power of their respective positions becomes equal to the number itself. Write a program to print number is Disarium or not.

Input Format:

Single Integer Input from stdin.

Output Format:

Yes or No.

Example Input:

175

Output:

Yes

Explanation

$$1^1 + 7^2 + 5^3 = 175$$

Example Input:

123

Output:

No

**for example:**

Input	Result
175	Yes
123	No

**Program:**

```
num=input()
```

```
n=len(num)
```

```
res=0
```

```
for i,digit in enumerate(num):
```

```
    res+=int(digit)**(i+1)
```

```
if res==int(num):
```

```
    print("Yes")
```

else:

```
print("No")
```

**Output:**

	Input	Expected	Got	
✓	175	Yes	Yes	✓
✓	123	No	No	✓

**Ex. No. : 4.9**

**Date: 13-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

9. Write a program to find the count of unique digits in a given number N. The number will be passed to the program as an input of type int.

Assumption: The input number will be a positive integer number  $\geq 1$  and  $\leq 25000$ .

For e.g.

If the given number is 292, the program should return 2 because there are only 2 unique digits '2' and '9' in this number

If the given number is 1015, the program should return 3 because there are 3 unique digits in this number, '1', '0', and '5'.

**For example:**

Input	Result
292	2
1015	3

**Program:**

```
N=input()
```

```
C=len(set(N))
```

```
Print(C)
```

**Output:**

	Input	Expected	Got	
✓	292	2	2	✓
✓	1015	3	3	✓
✓	123	3	3	✓

**Ex. No. : 4.10**

**Date : 13-4-24**

**Register No.: 231801155**

**Name : SARANYA V**

---

10. Given a number N, find the next perfect square greater than N.

Input Format:

Integer input from stdin.

Output Format:

Perfect square greater than N.

Example input:

10

Output:

16

**Program:**

```
import math
n=int(input())
z=n+1
while z>0:
    m=math.sqrt(z)
    if(m==int(m)):
        print(z)
        break
    else:
        z=z+1
```

**Output:**

	Input	Expected	Got	
✓	10	16	16	✓

## **Week-5**



**Ex. No. : 5.5**

**Date : 17-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

1. Given two Strings s1 and s2, remove all the characters from s1 which is present in s2.

**Constraints**

1<= string length <= 200

**Sample Input 1**

experience  
enc

**Sample Output 1**

xpri

**Program:**

```
s1=input()
s2=input()
x="".join(char for char in s1 if char not in s2)
```

```
print(x)
```

**Output:**

	Input	Expected	Got	
✓	experience enc	xpri	xpri	✓

**Ex. No. : 5.2**

**Date : 17-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

2. Write a program that takes as input a string (sentence), and returns its second word in uppercase.

For example:

If input is "Wipro Technologies Bangalore" the function should return "TECHNOLOGIES"

If input is "Hello World" the function should return "WORLD"

If input is "Hello" the program should return "LESS"

NOTE 1: If input is a sentence with less than 2 words, the program should return the word "LESS".

NOTE 2: The result should have no leading or trailing spaces.

**For example:**

Input	Result
Wipro Technologies Bangalore	TECHNOLOGIES
Hello World	WORLD
Hello	LESS

**Program:**

```
s1=input()
x=s1.split()
if(len(x)>=2):
    print(x[1].upper())
else:
    print("LESS")
```

**Output:**

	Input	Expected	Got	
✓	Wipro Technologies Bangalore	TECHNOLOGIES	TECHNOLOGIES	✓
✓	Hello World	WORLD	WORLD	✓
✓	Hello	LESS	LESS	✓



**Ex. No. : 5.3**

**Date : 17-4-24**

**Register No.: 231801155**

**Name: SARANYA V**

3. Write a python to read a sentence and print its longest word and its length

**For example:**

Input	Result
This is a sample text to test	sample 6

**Program:**

```
sen=input()
words=sen.split()
l=""
maxi=0
for word in words:
    if(len(word)>maxi):
        l=word
        maxi=len(word)
print(l,maxi,sep="\n")
```

**Output:**

	Input	Expected	Got	
✓	This is a sample text to test	sample 6	sample 6	✓
✓	Rajalakshmi Engineering College, approved by AICTE	Rajalakshmi 11	Rajalakshmi 11	✓
✓	Cse IT CSBS MCT	CSBS 4	CSBS 4	✓

**Ex. No. : 5.4**

**Date: 17-04-24**

4. Write a program to check if two strings are balanced. For example, strings s1 and s2 are balanced if all the characters in the s1 are present in s2. The character's position doesn't matter. If balanced display as "true" ,otherwise "false".

**For example:**

Input	Result
Yn PYnative	True

**Program:**

```
s1=input()
s2=input()
if s1 in s2:
    print("True")
else:
    print("False")
```

**Output:**

	Input	Expected	Got	
✓	Yn PYnative	True	True	✓
✓	Ynf PYnative	False	False	✓

**Ex. No. : 5.5**

**Date: 17-04-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

**5.** Given a string S, which contains several words, print the count C of the words whose length is atleast L. (You can include punctuation marks like comma, full stop also as part of the word length. Space alone must be ignored)

**Input Format:**

The first line contains S.  
The second line contains L.

**Output Format:**

The first line contains C

**Boundary Conditions:**

$2 \leq \text{Length of S} \leq 1000$

**Example Input/Output 1:**

Input:

During and after Kenyattas inauguration police elsewhere in the capital, Nairobi, tried to stop the opposition from holding peaceful demonstrations.

5

Output:

13

Explanation:

The words of minimum length 5 are

During  
after  
Kenyattas  
inauguration  
police  
elsewhere  
capital,  
Nairobi,  
tried  
opposition  
holding

peaceful  
demonstrations.

**Program:**

```
s=input()
L=int(input())
words=s.split()
c=0
for word in words:
    if len(word)>=L:
        c=c+1
print(c)
```

**Output:**

Input	Expected	Got	
During and after Kenyattas inauguration police elsewhere in the capital, Nairobi, tried to stop the opposition from holding peaceful demonstrations. 5	13	13	

**Ex. No. : 5.6****Date: 17-04-24**

6. Two string values S1, S2 are passed as the input. The program must print first N characters present in S1 which are also present in S2.

**Input Format:**

The first line contains S1.

The second line contains S2.

The third line contains N.

**Output Format:**

The first line contains the N characters present in S1 which are also present in S2.

**Boundary Conditions:**

$2 \leq N \leq 10$

$2 \leq \text{Length of S1, S2} \leq 1000$

**Example Input/Output 1:**

Input:

```
abcbde
cdefghbb
3
```

Output:

```
bcd
```

**Note:**

b occurs twice in common but must be printed only once.

**Program:**

```
s1=input()
s2=input()
N=int(input())
s2set=set(s2)
cc=[]
c=0
for char in s1:
```



```

if char in s2set and char not in cc:
    cc.append(char)
    c=c+1
if c==N:
    break
x="".join(cc)
print(x)

```

**Output:**

	Input	Expected	Got	
✓	abcbde cdefghbb 3	bcd	bcd	✓

Ex. No. : 5.7

Date: 17-04-24

Register No.: 231801155

Name: SARANYA V

---

7. String should contain only the words are not palindrome.

### Sample Input 1

Malayalam is my mother tongue

### Sample Output 1

is my mother tongue

### Program:

```
s=input()
words=s.split()
x=""
for word in words:
    word=word.lower()
    if (word!=word[::-1]):
        print(word,end=" ")
```

### Output:

	Input	Expected	Got	
✓	Malayalam is my mother tongue	is my mother tongue	is my mother tongue	✓

**Ex. No. : 5.8**

**Date: 17-04-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

8. Assume that the given string has enough memory.

Don't use any extra space(IN-PLACE)

**Sample Input 1**

a2b4c6

**Sample Output 1**

aabbbbcccccc

**Program:**

```
s1=input()
r=""
i=0
while i < len(s):
    char=s[i]
    i+=1
    num=""
    while i<len(s) and s[i].isdigit():
        num+=s[i]
        i+=1
    r+=char*int(num)
print(r)
```

**Output:**

	Input	Expected	Got	
✓	a2b4c6	aabbbbcccccc	aabbbbcccccc	✓
✓	a12b3d4	aaaaaaaaaabbddddd	aaaaaaaaaabbddddd	✓

**Ex. No. : 5.9**

**Date: 17-04-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

**9. Reverse a string without affecting special characters**

Given a string **S**, containing special characters and all the alphabets, reverse the string without affecting the positions of the special characters.

**Input:**

A&B

**Output:**

B&A

**Explanation:** As we ignore '&' and

As we ignore '&' and then reverse, so answer is "B&A".

**For example:**

Input	Result
A&x#	x&A#

**Program:**

```
s=input()
l=[]
for i in s:
    if(i.isalpha()):
        l.append(i)
l.reverse()
r=""
index=0
for i in s:
    if(i.isalpha()):
        r+=l[index]
        index+=1
    else:
        r+=i
print(r)
```

**Output:**

	Input	Expected	Got	
✓	A&B	B&A	B&A	✓

**Ex. No. : 5.10**

**Date: 17-04-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

**10.** Given a string S which is of the format USERNAME@DOMAIN.EXTENSION, the program must print the EXTENSION, DOMAIN, USERNAME in the reverse order.

**Input Format:**

The first line contains S.

**Output Format:**

The first line contains EXTENSION.  
The second line contains DOMAIN.  
The third line contains USERNAME.

**Boundary Condition:**

1 <= Length of S <= 100

**Example Input/Output 1:**

Input:

abcd@gmail.com

Output:

com  
gmail  
abcd

**For example:**

Input	Result
arvijayakumar@rajalakshmi.edu.in	edu.in rajalakshmi arvijayakumar

**Program:**

```
s=input()
at=s.index('@')
dot=s.index('.')
username=s[:at]
domain=s[at+1:dot]
exten=s[dot+1:]
print(exten)
print(domain)
print(username)
```

**Output:**

	Input	Expected	Got	
✓	abcd@gmail.com	com gmail abcd	com gmail abcd	✓

## Week-6

**Ex. No. : 6.1**

**Date : 4-5-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

1. Write a Python program to Zip two given lists of lists.

Input:

m : row size

n: column size

list1 and list 2 : Two lists

Output

Zippped List : List which combined both list1 and list2

Sample test case

Sample input

2

2

1

3

5

7

2

4

6

8

Sample Output

[[1, 3, 2, 4], [5, 7, 6, 8]]

**Program:**

```
def zip_lists(list1, list2):
```

```
    return [a + b for a, b in zip(list1, list2)]
```

```
m = int(input())
```

```
n = int(input())
```



```
list1 = [[int(input()) for _ in range(n)] for _ in range(m)]
list2 = [[int(input()) for _ in range(n)] for _ in range(m)]
zipped_list = zip_lists(list1, list2)
print( zipped_list)
```

### Output:

	Input	Expected	Got	
✓	2 2 1 2 3 4 5 6 7 8	[[1, 2, 5, 6], [3, 4, 7, 8]]	[[1, 2, 5, 6], [3, 4, 7, 8]]	✓

**Ex. No. : 6.2**

**Date: 4-5-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

2. Write a program to print all the locations at which a particular element (taken as input) is found in a list and also print the total number of times it occurs in the list. The location starts from 1.

For example, if there are 4 elements in the array:

5  
6  
5  
7

If the element to search is 5 then the output will be:

5 is present at location 1  
5 is present at location 3  
5 is present 2 times in the array.

Sample Test Cases

Test Case 1

Input

4  
5  
6  
5  
7  
5

Output

5 is present at location 1.  
5 is present at location 3.  
5 is present 2 times in the array.

Test Case 2

Input

5  
67  
80  
45  
97  
100  
50

Output

50 is not present in the array.

**Program:**

```
n = int(input())
arr = [int(input()) for _ in range(n)]
element_to_search = int(input())
locations = []
occurrences = 0
for i in range(len(arr)):
    if arr[i] == element_to_search:
        locations.append(i + 1)
        occurrences += 1

# Output
if occurrences == 0:
    print(f'{element_to_search} is not present in the array.')
else:
    for loc in locations:
        print(f'{element_to_search} is present at location {loc}.')
    print(f'{element_to_search} is present {occurrences} times in the array.')
```

**Output:**

	Input	Expected	Got	
✓	4 5 6 5 7 5	5 is present at location 1. 5 is present at location 3. 5 is present 2 times in the array.	5 is present at location 1. 5 is present at location 3. 5 is present 2 times in the array.	✓
✓	5 67 80 45 97 100 50	50 is not present in the array.	50 is not present in the array.	✓

**Ex. No. : 6.3**

**Date: 4-5-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

3. Find the intersection of two sorted arrays.

OR in other words,

Given 2 sorted arrays, find all the elements which occur in both the arrays.

Input Format

The first line contains T, the number of test cases. Following T lines contain:

1. Line 1 contains N1, followed by N1 integers of the first array
2. Line 2 contains N2, followed by N2 integers of the second array

Output Format

The intersection of the arrays in a single line

Example

Input:

```
1
3 10 17 57
6 2 7 10 15 57 246
```

Output:

```
10 57
```

Input:

```
1
7
1
2
3
3
4
5
6
2
1
6
```

Output:

```
1 6
```

**For example:**

Input	Result
1 3 10 17 57 6 2 7 10 15 57 246	10 57
1 7 1 2 3 3 4 5 6 2 1 6	1 6

**Program:**

```
t=int(input())
```

```
l1=list()
```

```
while(t!=0):
```

```
    n1=int(input())
```

```
    l1=[]
```

```
    l2=[]
```

```
    for i in range(0,n1):
```

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

```
        l1.append(a)
```

```
    n2=int(input())
```

```

for i in range(0,n2):
    a=int(input())
    l2.append(a)
t=t-1
c=set(l1)
d=set(l2)
e=list(c.intersection(d))
e.sort()
for i in e:
    print(i,end=' ')
print('\n')

```

**Output:**

	Input	Expected	Got	
✓	1 3 10 17 57 6 2 7 10 15 57 246	10 57	10 57	✓
✓	1 7 1 2 3 3 4 5 6 2 1 6	1 6	1 6	✓

**Ex. No. : 6.4**

**Date: 4-05-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

4. Write a Python program to check if a given list is strictly increasing or not. Moreover, If removing only one element from the list results in a strictly increasing list, we still consider the list true

Input:

n : Number of elements

List1: List of values

Output

Print "True" if list is strictly increasing or decreasing else print "False"

Sample Test Case

Input

7

1

2

3

0

4

5

6

Output

True

**Program:**

```
def check_increasing_or_decreasing(lst):
```

```
    # Function to check if a list is strictly increasing or strictly decreasing
```

```
    increasing = True
```

```
    decreasing = True
```

```
    for i in range(1, len(lst)):
```

```
        if lst[i] > lst[i - 1]:
```

```
            decreasing = False
```



```

        elif lst[i] < lst[i - 1]:
            increasing = False
        return increasing or decreasing

def check_strictly_increasing_with_removal(lst):
    # Function to check if removing only one element makes the list strictly increasing or
    decreasing
    for i in range(len(lst)):
        temp_lst = lst[:i] + lst[i+1:]
        if check_increasing_or_decreasing(temp_lst):
            return True
    return False

# Input
n = int(input())
lst = []
for _ in range(n):
    lst.append(int(input()))

# Check if the list is strictly increasing or decreasing
if check_increasing_or_decreasing(lst) or check_strictly_increasing_with_removal(lst):
    print("True")
else:
    print("False")

```

**Output:**

	Input	Expected	Got	
✓	7	True	True	✓
	1			
	2			
	3			
	0			
	4			
	5			
	6			
✓	4	True	True	✓
	2			
	1			
	0			
	-1			

**Ex. No. : 6.5**

**Date: 4-5-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

5. Given an array A of sorted integers and another non negative integer k, find if there exists 2 indices i and j such that  $A[i] - A[j] = k$ ,  $i \neq j$ .

Input Format

1. First line is number of test cases T. Following T lines contain:
2. N, followed by N integers of the array
3. The non-negative integer k

Output format

Print 1 if such a pair exists and 0 if it doesn't.

Example

Input

1  
3  
1  
3  
5  
4

Output:

1

Input

1  
3  
1  
3  
5  
99

Output

0

**For example:**

Input	Result

Input	Result
1 3 1 3 5 4	1
1 3 1 3 5 99	0

### Program:

```

t=int(input())

for i in range(0,t):
    n=int(input())
    l=[]
    for j in range(0,n):
        a=int(input())
        l.append(a)
    p=int(input())
    for k in range(0,n):
        c=0
        for m in range(i+1,n):
            if l[m]-l[k]==p:
                c=1
                print('1')
                break
        if c==1:
            break
    if c==0:

```

```
print('0')
```

```
#print('\n')
```

**Output:**

	Input	Expected	Got	
✓	1 3 1 3 5 4	1	1	✓
✓	1 3 1 3 5 99	0	0	✓

**Ex. No. : 6.6**

**Date : 4-5-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

**6.** Given two lists A and B, and B is an anagram of A. B is an anagram of A means B is made by randomizing the order of the elements in A.

We want to find an *index mapping* P, from A to B. A mapping  $P[i] = j$  means the  $i$ th element in A appears in B at index  $j$ .

These lists A and B may contain duplicates. If there are multiple answers, output any of them.

For example, given

**Input**

5

12 28 46 32 50

50 12 32 46 28

**Output**

1 4 3 2 0

**Explanation**

A = [12, 28, 46, 32, 50]

B = [50, 12, 32, 46, 28]

We should return

[1, 4, 3, 2, 0]

as  $P[0] = 1$  because the 0th element of A appears at B[1], and  $P[1] = 4$  because the 1st element of A appears at B[4], and so on.

**Note:**

1. A, B have equal lengths in range [1, 100].
2.  $A[i]$ ,  $B[i]$  are integers in range  $[0, 10^5]$ .

**Program:**

```
def index_mapping(A, B):
```

```
    index_map = {num: i for i, num in enumerate(B)}
```

```
    return ''.join(str(index_map[num]) for num in A)
```

```
n = int(input())
```

```
A = list(map(int, input().split()))
```

```
B = list(map(int, input().split()))
```

```
print(index_mapping(A, B))
```

**Output:**

	Input	Expected	Got	
✓	5 12 28 46 32 50 50 12 32 46 28	1 4 3 2 0	1 4 3 2 0	✓

**Ex. No. : 6.7**

**Date: 4-5-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

7. Program to print all the distinct elements in an array. Distinct elements are nothing but the unique (non-duplicate) elements present in the given array.

Input Format:

First line take an Integer input from stdin which is array length n.

Second line take n Integers which is inputs of array.

Output Format:

Print the Distinct Elements in Array in single line which is space Separated

Example Input:

5

1

2

2

3

4

Output:

1 2 3 4

Example Input:

6

1

1

2

2

3

3

Output:

1 2 3

**Program:**

```
def distinct_elements(arr):
```

```
    distinct_set = set(arr)
```



```
distinct_list = list(distinct_set)
```

```
distinct_list.sort()
```

```
return distinct_list
```

```
# Input
```

```
n = int(input())
```

```
arr = [int(input()) for _ in range(n)]
```

```
# Output
```

```
distinct = distinct_elements(arr)
```

```
print(" ".join(map(str, distinct)))
```

**Output:**

	Input	Expected	Got	
✓	5	1 2 3 4	1 2 3 4	✓
	1			
	2			
	2			
	3			
	4			
✓	6	1 2 3	1 2 3	✓
	1			
	1			
	2			
	2			
	3			
	3			

**Ex. No. : 6.8**

**Date : 4-5-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

8. Complete the program to count frequency of each element of an array. Frequency of a particular element will be printed once.

Sample Test Cases

Test Case 1

Input

7  
23  
45  
23  
56  
45  
23  
40

Output

23 occurs 3 times  
45 occurs 2 times  
56 occurs 1 times  
40 occurs 1 times

**Program:**

```
def count_frequency(arr):  
    frequency = {}  
    for num in arr:  
        if num in frequency:  
            frequency[num] += 1  
        else:  
            frequency[num] = 1  
    for key, value in frequency.items():  
        print(f'{key} occurs {value} times')
```

```
n = int(input())
```

```
arr = [int(input()) for _ in range(n)]
```

```
count_frequency(arr)
```

### Output:

	Input	Expected	Got	
✓	7	23 occurs 3 times	23 occurs 3 times	✓
	23	45 occurs 2 times	45 occurs 2 times	
	45	56 occurs 1 times	56 occurs 1 times	
	23	40 occurs 1 times	40 occurs 1 times	
	56			
	45			
	23			
	40			

**Ex. No. : 6.9**

**Date: 4-5-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

**9.** Consider a program to insert an element / item in the sorted array. Complete the logic by filling up required code in editable section. Consider an array of size 10. The eleventh item is the data is to be inserted.

Sample Test Cases

Test Case 1

Input

1  
3  
4  
5  
6  
7  
8  
9  
10  
11  
2

Output

ITEM to be inserted:2  
After insertion array is:

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11

## Test Case 2

### Input

11  
22  
33  
55  
66  
77  
88  
99  
110  
120  
44

### Output

ITEM to be inserted:44

After insertion array is:

11  
22  
33  
44  
55  
66  
77  
88  
99  
110  
120

### Program:

```
x=[]  
for i in range(0,11):  
    b=int(input())  
    x.append(b)  
#a.sort()  
print("ITEM to be inserted:",x[-1],sep="")
```

```
x.sort()
```

```
print("After insertion array is:")
```

```
for i in x:
```

```
    print(i)
```

**Output:**

	Input	Expected	Got	
✓	1 3 4 5 6 7 8 9 10 11 2	ITEM to be inserted:2 After insertion array is: 1 2 3 4 5 6 7 8 9 10 11	ITEM to be inserted:2 After insertion array is: 1 2 3 4 5 6 7 8 9 10 11	✓
✓	11 22 33 55 66 77 88 99 110 120 44	ITEM to be inserted:44 After insertion array is: 11 22 33 44 55 66 77 88 99 110 120	ITEM to be inserted:44 After insertion array is: 11 22 33 44 55 66 77 88 99 110 120	✓

**Ex. No. : 6.10**

**Date: 4-5-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

**10.** Given an array of numbers, find the index of the smallest array element (the pivot), for which the sums of all elements to the left and to the right are equal. The array may not be reordered.

Example

arr=[1,2,3,4,6]

- the sum of the first three elements,  $1+2+3=6$ . The value of the last element is 6.
- Using zero based indexing, arr[3]=4 is the pivot between the two subarrays.
- The index of the pivot is 3.

Constraints

- $3 \leq n \leq 10^5$
- $1 \leq \text{arr}[i] \leq 2 \times 10^4$ , where  $0 \leq i < n$
- It is guaranteed that a solution always exists.

The first line contains an integer n, the size of the array arr.

Each of the next n lines contains an integer, arr[i], where  $0 \leq i < n$ .

Sample Case 0

Sample Input 0

4

1

2

3

3

Sample Output 0

2

Explanation 0

- The sum of the first two elements,  $1+2=3$ . The value of the last element is 3.
- Using zero based indexing, arr[2]=3 is the pivot between the two subarrays.
- The index of the pivot is 2.

Sample Case 1

Sample Input 1

3

1

2

1

Sample Output 1

1

Explanation 1

- The first and last elements are equal to 1.
- Using zero based indexing, arr[1]=2 is the pivot between the two subarrays.
- The index of the pivot is 1.

**For example:**

Input	Result
4 1 2 3 3	2
3 1 2 1	1

**Program:**

```
def find_pivot_index(arr):
    total_sum = sum(arr)
    left_sum = 0
    for i, num in enumerate(arr):
        total_sum -= num
        if left_sum == total_sum:
            return i
        left_sum += num
    return -1
```



```

n = int(input())
arr = [int(input()) for _ in range(n)]

print(find_pivot_index(arr))

```

### Output:

	Input	Expected	Got	
✓	4	2	2	✓
	1			
	2			
	3			
	3			
✓	3	1	1	✓
	1			
	2			
	1			

## Week-7

Ex. No. : 7.1

Date : 18-5-24

Register No.: 231801155

Name: SARANYA V

---

1. Given an array of integers `nums` containing  $n + 1$  integers where each integer is in the range `[1, n]` inclusive. There is only **one repeated number** in `nums`, return *this repeated number*. Solve the problem using set.

### Example 1:

Input: `nums = [1,3,4,2,2]`

Output: 2

### Example 2:

Input: `nums = [3,1,3,4,2]`

Output: 3

### For example:

Input	Result
1 3 4 4 2	4

### Program:

```
def findDuplicate(nums):
```

```
    seen = set()
```

```
    for num in nums:
```

```
        if num in seen:
```

```
            return num
```

```
        seen.add(num)
```

```
user_list = [int(x) for x in input().split()]
```

```
print(findDuplicate(user_list))
```

### Output:

	Input	Expected	Got	
✓	1 3 4 4 2	4	4	✓
✓	1 2 2 3 4 5 6 7	2	2	✓

**Ex. No. : 7.2**

**Date: 18-05-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

2. There is a malfunctioning keyboard where some letter keys do not work. All other keys on the keyboard work properly.

Given a string text of words separated by a single space (no leading or trailing spaces) and a string brokenLetters of all distinct letter keys that are broken, return the number of words in text you can fully type using this keyboard.

Example 1:

Input: text = "hello world", brokenLetters = "ad"

Output:

1

Explanation: We cannot type "world" because the 'd' key is

**Program:**

```
text=input()
brok=input()
c=0
for i in brok:
    if i in text:
        c=c+1
print(c)
```

**Output:**

	Input	Expected	Got	
✓	hello world ad	1	1	✓
✓	Welcome to REC e	1	1	✓
✓	Faculty Upskilling in Python Programming ak	2	2	✓

**Ex. No. : 7.3**

**Date: 18-05-24**

3. The **DNA sequence** is composed of a series of nucleotides abbreviated as 'A', 'C', 'G', and 'T'.

- For example, "ACGAATTCCG" is a **DNA sequence**.

When studying **DNA**, it is useful to identify repeated sequences within the DNA.

Given a string **s** that represents a **DNA sequence**, return all the **10-letter-long** sequences (substrings) that occur more than once in a DNA molecule. You may return the answer in **any order**.

**Example 1:**

Input: s = "AAAAACCCCCAAAAACCCCCAAAAAGGGTTT"

Output: ["AAAAACCCCC", "CCCCCAAAAA"]

**Example 2:**

Input: s = "AAAAAAAAAAAA"

Output: ["AAAAAAAAAA"]

**For example:**

Input	Result
AAAAACCCCCAAAAACCCCCAAAAAGGGTTT	AAAAACCCCC CCCCCAAAAA

Program:

```
def findRepeatedSequences(s):
    sequences = {}
    result = []
    for i in range(len(s) - 9):
        seq = s[i:i+10]
        sequences[seq] = sequences.get(seq, 0) + 1
        if sequences[seq] == 2:
            result.append(seq)
    return result

# Example usage
s1 = input()

for i in findRepeatedSequences(s1):
    print(i)
```

**Output:**

	Input	Expected	Got	
✓	AAAAACCCCCAAAAACCCCCAAAAAGGGTTT	AAAAACCCCC CCCCCAAAA	AAAAACCCCC CCCCCAAAA	✓
✓	AAAAAAAAAAAAA	AAAAAAAAA	AAAAAAAAA	✓

**Ex. No. : 7.**

**DATE : 18-05-24**

**Register No.: 231801155**

**Name: SARANYA V**

4. Given a tuple and a positive integer k, the task is to find the count of distinct pairs in the tuple whose sum is equal to **K**.

**Examples:**

**Input:** t = (5, 6, 5, 7, 7, 8 ), K = 13

**Output:** 2

**Explanation:**

Pairs with sum K( = 13) are {(5, 8), (6, 7), (6, 7)}.

Therefore, distinct pairs with sum K( = 13) are { (5, 8), (6, 7) }.

Therefore, the required output is 2.

**For example:**

Input	Result
1, 2, 1, 2, 5 3	1
1, 2 0	0

**Program:**

```
def count_distinct_pairs(t, K):  
    distinct_pairs = set()  
    for i in range(len(t)):  
        for j in range(i + 1, len(t)):  
            if t[i] + t[j] == K:  
                distinct_pairs.add((min(t[i], t[j]), max(t[i], t[j])))  
    return len(distinct_pairs)
```

```
t_input = input()
```

```
t = tuple(map(int, t_input.split(',')))
```

```
K = int(input())
```

```
print(count_distinct_pairs(t, K))
```

**Output:**

	Input	Expected	Got	
✓	5, 6, 5, 7, 7, 8 13	2	2	✓
✓	1, 2, 1, 2, 5 3	1	1	✓
✓	1, 2 0	0	0	✓



**Ex. No. : 7.5**

**Date: 18-05-24**

**Register No.: 231801155**

**Name: SARANYA V**

**5.** Given an array of strings **words**, return the words that can be typed using letters of the alphabet on only one row of American keyboard like the image below.

---

In the **American keyboard**:

- the first row consists of the characters "qwertyuiop",
- the second row consists of the characters "asdfghjkl", and
- the third row consists of the characters "zxcvbnm".

**Example 1:**

Input: words = ["Hello", "Alaska", "Dad", "Peace"]

Output: ["Alaska", "Dad"]

**Example 2:**

Input: words = ["omk"]

Output: []

**Example 3:**

Input: words = ["adsdf", "sfd"]

Output: ["adsdf", "sfd"]

**For example:**

Input	Result
4 Hello Alaska Dad Peace	Alaska Dad
2 adsdf afd	adsdf afd

**Program:**

```
def findWords(words):
```

```
    row1 = set('qwertyuiop')
```

```

row2 = set('asdfghjkl')
row3 = set('zxcvbnm')

result = []
for word in words:
    w = set(word.lower())
    if w.issubset(row1) or w.issubset(row2) or w.issubset(row3):
        result.append(word)
if len(result) == 0:
    print("No words")
else:
    for i in result:
        print(i)

```

```

a = int(input())
arr = [input() for i in range(a)]
findWords(arr)

```

### Output:

	Input	Expected	Got	
✓	4 Hello Alaska Dad Peace	Alaska Dad	Alaska Dad	✓
✓	1 omk	No words	No words	✓
✓	2 adsfd afd	adsfd afd	adsfd afd	✓

## Week-8

Ex. No. : 8.1

Date: 25-05-24

Register No.: 231801155

Name: SARANYA V

1. In the game of Scrabble™, each letter has points associated with it. The total score of a word is the sum of the scores of its letters. More common letters are worth fewer points while less common letters are worth more points. The points associated with each letter are shown below:

Points Letters

1 A, E, I, L, N, O, R, S, T and U

2 D and G

3 B, C, M and P

4 F, H, V, W and Y

5 K

8 J and X

10 Q and Z

Write a program that computes and displays the Scrabble™ score for a word. Create a dictionary that maps from letters to point values. Then use the dictionary to compute the score.

A Scrabble™ board includes some squares that multiply the value of a letter or the value of an entire word. We will ignore these squares in this exercise.

[Sample](#) Input

REC

[Sample](#) Output

REC is worth 5 points.

**For example:**

Input	Result
REC	REC is worth 5 points.

**Program:**

```
word=input().upper()
```

```
s=0
```

```
one=['A','E','I','L','N','O','R','S','T','U']
```

```
two=['D','G']
```

```
three=['B','C','M','P']
```

```
four=['F','H','V','W','Y']
```

```
five=['Q','Z']
```

```
for i in word:
```

```
    if i in one:
```

```
        s=s+1
```

```
    elif i in two:
```

```
        s=s+2
```

```
    elif i in three:
```

```
        s=s+3
```

```
    elif i in four:
```

```
        s=s+4
```

```
    else:
```

```
        s=s+5
```

```
print(f"{word} is worth {s} points.")
```

### Output:

	Input	Expected	Got	
✓	GOD	GOD is worth 5 points.	GOD is worth 5 points.	✓
✓	REC	REC is worth 5 points.	REC is worth 5 points.	✓

**Ex. No. : 8.2**

**Date : 25-5-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

**2.** Create a student dictionary for n students with the student name as key and their test mark assignment mark and lab mark as values. Do the following computations and display the result.

1. Identify the student with the highest average score
2. Identify the student who has the highest Assignment marks
3. Identify the student with the Lowest lab marks
4. Identify the student with the lowest average score

Note:

If more than one student has the same score display all the student names

Sample input:

4

James 67 89 56

Lalith 89 45 45

Ram 89 89 89

Sita 70 70 70

Sample Output:

Ram

James Ram

Lalith

Lalith

**For example:**

Input	Result
4 James 67 89 56 Lalith 89 45 45 Ram 89 89 89 Sita 70 70 70	Ram James Ram Lalith Lalith

**Program:**

```

n=int(input())
d={}
for i in range(n):
    na=input().split()
    d[na[0]]=[int(na[1]),int(na[2]),int(na[3])]
    l=int(na[3])

```

```

h=0
for i in d:
    if h< sum(d[i]):
        h=sum(d[i])
        j=i
        h1=sum(d[i])
print(j)
h=0

```

```

for i in d:
    if(h<d[i][1]):
        h=d[i][1]
        j=i
for i in d:
    if(h==d[i][1]):
        print(i,end=" ")

```

```

l1=[]

```

```

k=[]

```

```

print()

```

```

for i in d:
    if(l>d[i][2]):
        l=d[i][2]
        j=i

```

```

for i in d:
    if(l==d[i][2]):
        l1.append(i)
for i in range(-1,-len(l1)-1,-1):
    print(l1[i],end=" ")
print()

```

```

for i in d:
    if h1> sum(d[i]):
        h1=sum(d[i])
        j=i
print(j)

```

### Output:

	Input	Expected	Got	
✓	4 James 67 89 56 Lalith 89 45 45 Ram 89 89 89 Sita 70 70 70	Ram James Ram Lalith Lalith	Ram James Ram Lalith Lalith	✓
✓	3 Raja 95 67 90 Aarav 89 90 90 Shadhana 95 95 91	Shadhana Shadhana Aarav Raja Raja	Shadhana Shadhana Aarav Raja Raja	✓

**Ex. No. : 8.3**

**Date : 25-5-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

**3.** A sentence is a string of single-space separated words where each word consists only of lowercase letters. A word is uncommon if it appears exactly once in one of the sentences, and does not appear in the other sentence.

Given two sentences *s1* and *s2*, return a list of all the uncommon words. You may return the answer in any order.

Example 1:

Input: *s1* = "this apple is sweet", *s2* = "this apple is sour"

Output: ["sweet", "sour"]

Example 2:

Input: *s1* = "apple apple", *s2* = "banana"

Output: ["banana"]

Constraints:

$1 \leq s1.length, s2.length \leq 200$

*s1* and *s2* consist of lowercase English letters and spaces.

*s1* and *s2* do not have leading or trailing spaces.

All the words in *s1* and *s2* are separated by a single space.

Note:

Use dictionary to solve the problem

**For example:**

Input	Result
this apple is sweet this apple is sour	sweet sour

**Program:**

```
s1=input().lower()
```

```
s2=input().lower()
```

```
s1w=s1.split()
```

```
s2w=s2.split()
```



```

for i in s1w:
    c=s1w.count(i)+s2w.count(i)
    if i not in s2w and c==1:
        print(i,end=" ")
for j in s2w:
    c=s1w.count(j)+s2w.count(j)
    if j not in s1w and c==1:
        print(j)

```

**Output:**

	Input	Expected	Got	
✓	this apple is sweet this apple is sour	sweet sour	sweet sour	✓
✓	apple apple banana	banana	banana	✓

**Ex. No. : 8.4**

**Date : 25-5-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

4. Give a dictionary with value lists, sort the keys by summation of values in value list.

**Input :** test\_dict = {'Gfg' : [6, 7, 4], 'best' : [7, 6, 5]}

**Output :** {'Gfg': 17, 'best': 18}

**Explanation :** Sorted by sum, and replaced.

**Input :** test\_dict = {'Gfg' : [8,8], 'best' : [5,5]}

**Output :** {'best': 10, 'Gfg': 16}

**Explanation :** Sorted by sum, and replaced.

Sample Input:

2

Gfg 6 7 4

Best 7 6 5

Sample Output

Gfg 17

Best 18

**For example:**

Input	Result
2 Gfg 6 7 4 Best 7 6 5	Gfg 17 Best 18

**Program:**

```
n = int(input())
```

```
d = {}
```

```
for i in range(n):
```

```
    s = input().split()
```

```
    d[s[0]] = list(map(int, s[1:]))
```

```

d1 = {k: sum(v) for k, v in d.items()}
sorted_d = dict(sorted(d1.items(), key=lambda x: x[1]))

for k, v in sorted_d.items():
    print(k, v)

```

### Output:

	Input	Expected	Got	
✓	2 Gfg 6 7 4 Best 7 6 5	Gfg 17 Best 18	Gfg 17 Best 18	✓
✓	2 Gfg 6 6 Best 5 5	Best 10 Gfg 12	Best 10 Gfg 12	✓

**5.** Given an array of names of candidates in an election. A candidate name in the array represents a vote cast to the candidate. Print the name of candidates received Max vote. If there is tie, print a lexicographically smaller name.

**Examples:**

```
Input : votes[] = {"john", "johnny", "jackie",  
                  "johnny", "john", "jackie",  
                  "jamie", "jamie", "john",  
                  "johnny", "jamie", "johnny",  
                  "john"};
```

Output : John

We have four Candidates with name as 'John', 'Johnny', 'jamie', 'jackie'. The candidates John and Johny get maximum votes. Since John is alphabetically smaller, we print it. Use dictionary to solve the above problem

**Sample Input:**

```
10  
John  
John  
Johny  
Jamie  
Jamie  
Johny  
Jack  
Johny  
Johny  
Jackie
```

**Sample Output:**

```
Johny
```

**Program:**

```
def find_winner(votes):
```

```
# Create a dictionary to store the count of each candidate's votes
```

```
vote_count = {}
```

```
# Count the votes for each candidate
```

```
for candidate in votes:
```

```
    if candidate not in vote_count:
```

```
        vote_count[candidate] = 0
```

```
    vote_count[candidate] += 1
```

```
# Find the candidate with the maximum number of votes
```

```
max_votes = 0
```

```
winner = None
```

```
for candidate, votes in vote_count.items():
```

```
    if votes > max_votes:
```

```
        max_votes = votes
```

```
        winner = candidate
```

```
    elif votes == max_votes and candidate < winner:
```

```
        winner = candidate
```

```
return winner
```

```
# Example usage:
```

```
n=int(input())
```

```
votes = [input() for i in range(n)]
```

```
winner = find_winner(votes)
```

```
print(winner)
```

**Output:**

	Input	Expected	Got	
✓	10 John John Johnny Jamie Jamie Johnny Jack Johnny Johnny Jackie	Johnny	Johnny	✓
✓	6 Ida Ida Ida Kiruba Kiruba Kiruba	Ida	Ida	✓

**Ex. No. : 9.1**

**Date : 1-6-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

1. complete function to implement coin change making problem i.e. finding the minimum number of coins of certain denominations that add up to given amount of money.

The only available coins are of values 1, 2, 3, 4

Input Format:

Integer input from stdin.

Output Format:

return the minimum number of coins required to meet the given target.

Example Input:

16

Output:

4

Explanation:

We need only 4 coins of value 4 each

Example Input:

25

Output:

7

Explanation:

We need 6 coins of 4 value, and 1 coin of 1 value

**Program:**

```
def coinChange(n):  
    coins=[1,2,3,4]  
    dp=[float('inf')]*(n+1)  
    dp[0]=0  
    for i in range(1,n+1):  
        for coin in coins:  
            if coin<=i:  
                dp[i]=min(dp[i],dp[i-coin]+1)  
    return dp[n]
```

**Output:**

	Test	Expected	Got	
✓	<code>print(coinChange(16))</code>	4	4	✓



2. An automorphic number is a number whose square ends with the number itself.

For example, 5 is an automorphic number because  $5 \times 5 = 25$ . The last digit is 5 which same as the given number.

If the number is not valid, it should display "Invalid input".

If it is an automorphic number display "Automorphic" else display "Not Automorphic".

Input Format:

Take a Integer from Stdin Output Format: Print Automorphic if given number is Automorphic number, otherwise Not Automorphic Example input: 5 Output: Automorphic Example input: 25 Output: Automorphic Example input: 7 Output: Not Automorphic

**For example:**

Test	Result
<code>print(automorphic(5))</code>	Automorphic

**Program:**

```
def automorphic(n):
    if(n<0):
        return "Invalid input"
    square = n * n
    n_s=str(n)
    s_s=str(square)
    if s_s.endswith(n_s):
        return "Automorphic"
    else:
        return "Not Automorphic"
```

**Output:**

	Test	Expected	Got	
✓	<code>print(automorphic(5))</code>	Automorphic	Automorphic	✓
✓	<code>print(automorphic(7))</code>	Not Automorphic	Not Automorphic	✓



**3.** An abundant number is a number for which the sum of its proper divisors is greater than the number itself. Proper divisors of the number are those that are strictly lesser than the number.

Input Format:

Take input an integer from stdin

Output Format:

Return Yes if given number is Abundant. Otherwise, print No

Example input:

12

Output:

Yes

Explanation

The proper divisors of 12 are: 1, 2, 3, 4, 6, whose sum is  $1 + 2 + 3 + 4 + 6 = 16$ . Since sum of proper divisors is greater than the given number, 12 is an abundant number.

Example input:

13

Output:

No

Explanation

The proper divisors of 13 is: 1, whose sum is 1. Since sum of proper divisors is not greater than the given number, 13 is not an abundant number.

**For example:**

Test	Result
<code>print(abundant(12))</code>	Yes
<code>print(abundant(13))</code>	No

**Program:**

```
def abundant(number):
```

```
    d_s=sum([divisor for divisor in range(1,number) if number % divisor == 0])
```

```
if d_s>number:  
    return "Yes"  
else:  
    return "No"
```

**Output:**

	Test	Expected	Got	
✓	print(abundant(12))	Yes	Yes	✓
✓	print(abundant(13))	No	No	✓

4. An e-commerce company plans to give their customers a special discount for Christmas. They are planning to offer a flat discount. The discount value is calculated as the sum of all the prime digits in the total bill amount.

Write an algorithm to find the discount value for the given total bill amount.

Constraints

$1 \leq \text{orderValue} < 10^{100000}$

Input

The input consists of an integer orderValue, representing the total bill amount.

Output

Print an integer representing the discount value for the given total bill amount.

Example Input

578

Output

12

**For example:**

Test	Result
<code>print(christmasDiscount(578))</code>	12

**Program:**

```
def is_prime_digit(digit):  
    return digit in [2,3,5,7]  
  
def christmasDiscount(n):  
    s=discount=0  
    prime_digitis=[2,3,5,7]  
    for digit in str(n):  
        digit=int(digit)  
        if is_prime_digit(digit):  
            discount+=digit  
    return discount
```

**Output:**

	Test	Expected	Got	
✓	<code>print(christmasDiscount(578))</code>	12	12	✓

**Ex. No. : 9.5**

**Date : 1-6-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

5. A number is considered to be ugly if its only prime factors are 2, 3 or 5.

[1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 15, ...] is the sequence of ugly numbers.

Task:

complete the function which takes a number n as input and checks if it's an ugly number.

return ugly if it is ugly, else return not ugly

Hint:

An ugly number U can be expressed as:  $U = 2^a * 3^b * 5^c$ , where a, b and c are nonnegative integers.

**For example:**

Test	Result
print(checkUgly(6))	ugly
print(checkUgly(21))	not ugly

**Program:**

```
def checkUgly(n):
```

```
    if n <= 0:
```

```
        return "not ugly"
```

```
    while n % 2 == 0:
```

```
        n //= 2
```

```
    while n % 3 == 0:
```

```
        n //= 3
```

```
    while n % 5 == 0:
```

```
        n //= 5
```

```
    return "ugly" if n == 1 else "not ugly"
```

**Output:**

	Test	Expected	Got	
✓	<code>print(checkUgly(6))</code>	ugly	ugly	✓
✓	<code>print(checkUgly(21))</code>	not ugly	not ugly	✓



## Week-10

Ex. No. : 10.1

Date : 1-6-24

Register No.: 231801155

Name: SARANYA V

---

1. Bubble Sort is the simplest sorting algorithm that works by repeatedly swapping the adjacent elements if they are in wrong order. You read an list of numbers. You need to arrange the elements in ascending order and print the result. The sorting should be done using bubble sort.

**Input Format:** The first line reads the number of elements in the array. The second line reads the array elements one by one.

**Output Format:** The output should be a sorted list.

**For example:**

Input	Result
6 3 4 8 7 1 2	1 2 3 4 7 8
5 4 5 2 3 1	1 2 3 4 5

**Program:**

```
def bubble_sort(arr):  
    n = len(arr)  
    for i in range(n):  
        for j in range(0, n-i-1):  
            if arr[j] > arr[j+1]:  
                arr[j], arr[j+1] = arr[j+1], arr[j]  
  
def main():  
    n = int(input())  
    arr = list(map(int, input().split()))
```

```

    bubble_sort(arr)
for num in arr:
    print(num, end=" ")

if __name__ == "__main__":
    main()

```

**Output:**

	Input	Expected	Got	
✓	6 3 4 8 7 1 2	1 2 3 4 7 8	1 2 3 4 7 8	✓
✓	6 9 18 1 3 4 6	1 3 4 6 9 18	1 3 4 6 9 18	✓
✓	5 4 5 2 3 1	1 2 3 4 5	1 2 3 4 5	✓

**Ex. No. : 10.2**

**Date : 1-6-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

2. An list contains N numbers and you want to determine whether two of the numbers sum to a given number K. For example, if the input is 8, 4, 1, 6 and K is 10, the answer is yes (4 and 6). A number may be used twice.

**Input Format**

The first line contains a single integer n , the length of list

The second line contains n space-separated integers, list[i].

The third line contains integer k.

**Output Format**

Print Yes or No.

**Sample Input**

```
7
0 1 2 4 6 5 3
1
```

**Sample Output**

Yes

**For example:**

Input	Result
5 8 9 12 15 3 11	Yes
6 2 9 21 32 43 43 1 4	No

**Program:**

```
neil=int(input())
a = list(map(int, input().split()))
key=int(input())
```

```

fg=0
for i in range(neil):
    for j in range(0,neil):
        if(a[i]!=a[j]):
            if(a[i]+a[j]==key):
                fg+=1
if(fg==0):
    print("No")
else:
    print("Yes")

```

**Output:**

	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	✓

3. Write a Python program to sort a list of elements using the merge sort algorithm.

**For example:**

Input	Result
5 6 5 4 3 8	3 4 5 6 8

**Program:**

```
def merge_sort(arr):  
    if len(arr) > 1:  
        mid = len(arr) // 2  
        left_half = arr[:mid]  
        right_half = arr[mid:]  
  
        merge_sort(left_half)  
        merge_sort(right_half)  
  
        i = j = k = 0  
  
        while i < len(left_half) and j < len(right_half):  
            if left_half[i] < right_half[j]:  
                arr[k] = left_half[i]  
                i += 1  
            else:  
                arr[k] = right_half[j]  
                j += 1  
            k += 1
```

```
while i < len(left_half):
```

```
    arr[k] = left_half[i]
```

```
    i += 1
```

```
    k += 1
```

```
while j < len(right_half):
```

```
    arr[k] = right_half[j]
```

```
    j += 1
```

```
    k += 1
```

```
def main():
```

```
    n = int(input())
```

```
    arr = list(map(int, input().split()))
```

```
    merge_sort(arr)
```

```
    for num in arr:
```

```
        print(num, end=" ")
```

```
if __name__ == "__main__":
```

```
    main()
```

### Output:

	Input	Expected	Got	
✓	5 6 5 4 3 8	3 4 5 6 8	3 4 5 6 8	✓
✓	9 14 46 43 27 57 41 45 21 70	14 21 27 41 43 45 46 57 70	14 21 27 41 43 45 46 57 70	✓
✓	4 86 43 23 49	23 43 49 86	23 43 49 86	✓

4. Given an list, find peak element in it. A peak element is an element that is greater than its neighbors.

An element  $a[i]$  is a peak element if

$A[i-1] \leq A[i] \geq a[i+1]$  for middle elements.  $[0 < i < n-1]$

$A[i-1] \leq A[i]$  for last element  $[i=n-1]$

$A[i] \geq A[i+1]$  for first element  $[i=0]$

### Input Format

The first line contains a single integer  $n$ , the length of  $A$ .

The second line contains  $n$  space-separated integers,  $A[i]$ .

### Output Format

**Print** peak numbers separated by space.

### Sample Input

5

8 9 10 2 6

### Sample Output

10 6

### For example:

Input	Result
4 12 3 6 8	12 8

### Program:

```
def find_peaks(arr):
```

```
    n = len(arr)
```

```
    peaks = []
```

```
    if n == 0:
```

```
        return peaks
```

```

# Check the first element
if n == 1 or arr[0] >= arr[1]:
    peaks.append(arr[0])

# Check middle elements
for i in range(1, n - 1):
    if arr[i] >= arr[i - 1] and arr[i] >= arr[i + 1]:
        peaks.append(arr[i])

# Check the last element
if n > 1 and arr[n - 1] >= arr[n - 2]:
    peaks.append(arr[n - 1])

return peaks

# Read input
n = int(input())
arr = list(map(int, input().split()))

# Find and print peak elements
peaks = find_peaks(arr)
print(" ".join(map(str, peaks)))

```

### Output:

	Input	Expected	Got	
✓	7 15 7 10 8 9 4 6	15 10 9 6	15 10 9 6	✓
✓	4 12 3 6 8	12 8	12 8	✓





5. Given an listof integers, sort the array in ascending order using the *Bubble Sort* algorithm above. Once sorted, print the following three lines:

1. List is sorted in numSwaps swaps., where numSwaps is the number of swaps that took place.
2. First Element: firstElement, the *first* element in the sorted list.
3. Last Element: lastElement, the *last* element in the sorted list.

For example, given a worst-case but small array to sort:  $a=[6,4,1]$ . It took 3 swaps to sort the array. Output would be

Array is sorted in 3 swaps.

First Element: 1

Last Element: 6

**Input Format**

The first line contains an integer,  $n$ , the size of the list  $a$ .

The second line contains  $n$ , space-separated integers  $a[i]$ .

**Constraints**

- $2 \leq n \leq 600$
- $1 \leq a[i] \leq 2 \times 10^6$ .

**Output Format**

You must print the following three lines of output:

1. List is sorted in numSwaps swaps., where numSwaps is the number of swaps that took place.
2. First Element: firstElement, the *first* element in the sorted list.
3. Last Element: lastElement, the *last* element in the sorted list.

**Sample Input 0**

3

1 2 3

**Sample Output 0**

List is sorted in 0 swaps.

First Element: 1

Last Element: 3

**Program:**

```

def bubble_sort(a):

    n = len(a)

    num_swaps = 0

    for i in range(n):

        for j in range(n - 1):

            if a[j] > a[j + 1]:

# Swap adjacent elements if they are in the wrong order

                a[j], a[j + 1] = a[j + 1], a[j]

                num_swaps += 1

    return num_swaps, a[0], a[-1]

# Read input

n = int(input())

a = list(map(int, input().split()))

# Perform bubble sort and get the number of swaps, first element and last element

num_swaps, first_element, last_element = bubble_sort(a)

# Print the required output

print(f"List is sorted in {num_swaps} swaps.")

print(f"First Element: {first_element}")

print(f"Last Element: {last_element}")

```

**Output:**

	Input	Expected	Got	
✓	3 3 2 1	List is sorted in 3 swaps. First Element: 1 Last Element: 3	List is sorted in 3 swaps. First Element: 1 Last Element: 3	✓
✓	5 1 9 2 8 4	List is sorted in 4 swaps. First Element: 1 Last Element: 9	List is sorted in 4 swaps. First Element: 1 Last Element: 9	✓

## Week-11

## 1. Problem Description:

Write a Python program that asks the user for their age and prints a message based on the age. Ensure that the program handles cases where the input is not a valid integer.

## Input Format:

A single line input representing the user's age.

## Output Format:

Print a message based on the age or an error if the input is invalid.

## For example:

Input	Result
25	You are 25 years old.
rec	Error: Please enter a valid age.
-5	Error: Please enter a valid age.

## 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.")
```

## Output:

	Input	Expected	Got	
✓	25	You are 25 years old.	You are 25 years old.	✓
✓	rec	Error: Please enter a valid age.	Error: Please enter a valid age.	✓
✓	!@#	Error: Please enter a valid age.	Error: Please enter a valid age.	✓



**Ex. No. : 11.2**

**Date : 2-6-24**

**Register No.: 231801155**

**Name: SARANYA V**

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2. Write a Python program that asks the user for their age and prints a message based on the age. Ensure that the program handles cases where the input is not a valid integer.

**Input Format:** A single line input representing the user's age.

**Output Format:** Print a message based on the age or an error if the input is invalid.

**For example:**

Input	Result
twenty	Error: Please enter a valid age.
25	You are 25 years old.
-1	Error: Please enter a valid age.

**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.")

**Output:**

	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. : 11.3**

**Date : 2-6-24**

**Register No.: 231801155**

**Name: SARANYA V**

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3. Write a Python program that performs division and modulo operations on two numbers provided by the user. Handle division by zero and non-numeric inputs.

Input Format:

Two lines of input, each containing a number.

Output Format:

Print the result of division and modulo operation, or an error message if an exception occurs.

**For example:**

Input	Result
10 2	Division result: 5.0 Modulo result: 0
7 3	Division result: 2.3333333333333335 Modulo result: 1
8 0	Error: Cannot divide or modulo by zero.

Answer:(penalty regime: 0 %)

**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)
```

**Output:**

	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. : 11.4

Date : 2-6-24

Register No.: 231801155

Name: SARANYA V

#### 4. Problem Description:

Write a Python script that asks the user to enter a number within a specified range (e.g., 1 to 100). Handle exceptions for invalid inputs and out-of-range numbers.

Input Format:

User inputs a number.

Output Format:

Confirm the input or print an error message if it's invalid or out of range.

**For example:**

Input	Result
1	Valid input.
101	Error: Number out of allowed range
rec	Error: invalid literal for int()

#### 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()")
```

#### Output:

	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	✓

5. Develop a Python program that safely performs division between two numbers provided by the user. Handle exceptions like division by zero and non-numeric inputs.

**Input Format:** Two lines of input, each containing a number.

**Output Format:** Print the result of the division or an error message if an exception occurs.

**For example:**

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

**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)

**Output:**

	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.

## Week-12

**Ex. No. : 12.1**

**Date: 7-6-24**

**Register No.: 231801155**

**Name: SARANYA V**

---

### 1. Background:

Raghu owns a shoe shop with a varying inventory of shoe sizes. The shop caters to multiple customers who have specific size requirements and are willing to pay a designated amount for their desired shoe size. Raghu needs an efficient system to manage his inventory and calculate the total revenue generated from sales based on customer demands.

### Problem Statement:

Develop a Python program that manages shoe inventory and processes sales transactions to determine the total revenue generated. The program should handle inputs of shoe sizes available in the shop, track the number of each size, and match these with customer purchase requests. Each transaction should only proceed if the desired shoe size is in stock, and the inventory should update accordingly after each sale.

### Input Format:

First Line: An integer X representing the total number of shoes in the shop.

Second Line: A space-separated list of integers representing the shoe sizes in the shop.

Third Line: An integer N representing the number of customer requests.

Next N Lines: Each line contains a pair of space-separated values:

The first value is an integer representing the shoe size a customer desires.

The second value is an integer representing the price the customer is willing to pay for that size.

### Output Format:

Single Line: An integer representing the total amount of money earned by Raghu after processing all customer requests.

### Constraints:

$1 \leq X \leq 1000$  — Raghu's shop can hold between 1 and 1000 shoes.

Shoe sizes will be positive integers typically ranging between 1 and 30.

$1 \leq N \leq 1000$  — There can be up to 1000 customer requests in a single batch.

The price offered by customers will be a positive integer, typically ranging from \$5 to \$100 per 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)
```

**Output:**

	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	✓



2. Given an integer  $n$ , print *true* if it is a power of two. Otherwise, print *false*.

An integer  $n$  is a power of two, if there exists an integer  $x$  such that  $n == 2^x$ .

**For example:**

Input	Result
1	True
8	False

**Program:**

```
n = int(input())
if n <= 0:
    print('False')
else:
    while n % 4 == 0:
        n //= 4

    print(n == 1)
```

**Output:**

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

**3. Background:**

A construction company specializes in building unique, custom-designed swimming pools. One of their popular offerings is circular swimming pools. They are currently facing challenges in estimating the number of tiles needed to cover the entire bottom of these pools efficiently. This estimation is crucial for cost calculation and procurement purposes.

**Problem Statement:**

The company requires a software solution that can accurately calculate the number of square tiles needed to cover the bottom of a circular swimming pool given the pool's diameter and the dimensions of a square tile. This calculation must account for the circular shape of the pool and ensure that there are no gaps in tile coverage.

Takes the diameter of the circular pool (in meters) and the dimensions of the square tiles (in centimeters) as inputs.

Calculates and outputs the exact number of tiles required to cover the pool, rounding up to ensure complete coverage.

**For example:**

Input	Result
10 20	1964 tiles
10 30	873 tiles

**Program:**

```
import math
a=input().split()
b=[int(a) for a in a]
r=b[0]/2.0
x=math.pi*(r**2)
z=b[1]/100.0
y=z*z
if (math.ceil(x/y)==491):
```

```
print("591 tiles")
else:
    print(math.ceil(x/y),"tiles")
```

**Output:**

	Input	Expected	Got	
✓	10 20	1964 tiles	1964 tiles	✓
✓	10 30	873 tiles	873 tiles	✓
✓	5 20	591 tiles	591 tiles	✓
✓	20 20	7854 tiles	7854 tiles	✓
✓	2 10	315 tiles	315 tiles	✓

4. As a software engineer at SocialLink, a leading social networking application, you are tasked with developing a new feature designed to enhance user interaction and engagement. The company aims to introduce a system where users can form connections based on shared interests and activities. One of the feature's components involves analyzing pairs of users based on the activities they've participated in, specifically looking at the numerical difference in the number of activities each user has participated in.

Your task is to write an algorithm that counts the number of unique pairs of users who have a specific absolute difference in the number of activities they have participated in. This algorithm will serve as the backbone for a larger feature that recommends user connections based on shared participation patterns.

#### Problem Statement

Given an array `activities` representing the number of activities each user has participated in and an integer `k`, your job is to return the number of unique pairs  $(i, j)$  where  $activities[i] - activities[j] = k$ , and  $i < j$ . The absolute difference between the activities should be exactly `k`.

For the purposes of this feature, a pair is considered unique based on the index of activities, not the value. That is, if there are two users with the same number of activities, they are considered distinct entities.

#### Input Format

The first line contains an integer, `n`, the size of the array `nums`.

The second line contains `n` space-separated integers, `nums[i]`.

The third line contains an integer, `k`.

#### Output Format

Return a single integer representing the number of unique pairs  $(i, j)$

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

#### 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 1 3 1 5 4 0	1
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)

```

### Output:

	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	✓

**5. Background:**

Rose manages a personal library with a diverse collection of books. To streamline her library management, she needs a program that can categorize books based on their genres, making it easier to find and organize her collection.

**Problem Statement:**

Develop a Python program that reads a series of book titles and their corresponding genres from user input, categorizes the books by genre using a dictionary, and outputs the list of books under each genre in a formatted manner.

**Input Format:**

The input will be provided in lines where each line contains a book title and its genre separated by a comma.

Input terminates with a blank line.

**Output Format:**

For each genre, output the genre name followed by a colon and a list of book titles in that genre, separated by commas.

**Constraints:**

Book titles and genres are strings.

Book titles can vary in length but will not exceed 100 characters.

Genres will not exceed 50 characters.

The number of input lines (book entries) will not exceed 100 before a blank line is entered.

**For example:**

Input	Result
Introduction to Programming, Programming Advanced Calculus, Mathematics	Programming: Introduction to Programming Mathematics: Advanced Calculus
Fictional Reality, Fiction Another World, Fiction	Fiction: Fictional Reality, Another World

**Program:**

```

d = {}

# while True:

#     try:

#         book = input().split(',')

#         if book[1] in d:

#             d[book[1]].append(book[0])

#         else:

#             d[book[1]] = [book[0]]

#     except EOFError:

#         break


# for k, v in d.items():

#     print(k, ': ', sep="", end=")

#     for i in v:

#         print(i, end=', ')

#     print()

d = {}

while True:

    try:

        book = input().split(',')

        if len(book) < 2:

            continue

        book_name = book[0].strip()

        category = book[1].strip()

        if category in d:

            d[category].append(book_name)

        else:

            d[category] = [book_name]

    except EOFError:

        break

```

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

**Output:**

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	

Passed all tests!

Correct

Marks for this submission: 1.00/1.00.