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# 01 - Introduction to Python-Variables-Datatypes Input/Output-Formatting

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*Sample Output:* 10,<class 'int'> 10.9,<class 'float'>

##### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| 10 | 10,<class 'int'> |
| 10.9 | 10.9,<class 'float'> |

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**Ex. No. : 1.1 Date:13.3.2024**

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**Register No.:231401009 Name:M.ANJALI**

### Converting Input Strings

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

*Sample Input:*

10

10.9

*a=int(input()) b=float(input()) print(a,type(a),sep=",")*

*print(round(b,1),type(b),sep=",")*

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*Sample Input:*

.



10000

*Sample Output:*

16000

##### For example:

**Input Result**

10000 16000

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**Ex. No. : 1.2 Date: 13.3.2024**

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**Register No.: 231401009 Name: M.Anjali**

### Gross Salary

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.

a=int(input()) b=int(a+(a\*40/100)+(a\*20/100)) print(b)

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Sample Input: 8.00

Sample Output: 2.828

##### For example:

**Input Result**

14.00 3.742

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### Square Root

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.

CODE:

a=float(input()) import math b=float(math.sqrt(a)) c=format(b,'.3f') print(c)

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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.

##### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| 45500 | 30.43 is the gain percent. |
| 500 |  |
| 60000 |  |

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### Gain percent

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.

CODE:

x=int(input()) y=int(input()) z=int(input()) a=x+y

n=((z-a)/a)\*100

print(format(n,'.2f'),"is the gain percent.")

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Sample Input 10

20

Sample Output

Your total refund will be $6.00.

##### For example:

|  |  |
| --- | --- |
| **Input Result** | |
| 20  20 | Your total refund will be $7.00. |

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### Deposits

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.

CODE:

a=int(input()) b=int(input()) c=a\*0.10 d=b\*0.25 e=c+d f=format(e,'.2f')

print("Your total refund will be $",f,sep="",end=".")

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##### Sample Input:

450

##### Sample Output:

weekdays 10.38

weekend 0.38

##### For example:

|  |  |
| --- | --- |
| **Input Result** | |
| 450 | weekdays 10.38  weekend 0.38 |

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**Ex. No. : 1.6 Date: 13.3.2024**

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### Carpenter

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

CODE:

x=int(input())

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a=abs(x-(50\*10)) b=a/(80+50)

.



print("weekdays",format(b+10,'.2f'))

print("weekend",format(b,'.2f'))

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# 02- Operators in Python

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Sample Input 10

.



20

Sample Output

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

###### For example:

|  |  |
| --- | --- |
| **Input Result** | |
| 10  20 | The total weight of all these widgets and gizmos is 2990 grams. |

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**Ex. No. : 2.1 Date:**

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**Register No.: Name:**

### Widgets and Gizmos

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.

**CODE:**

**w=int(input()) g=int(input())**

**print("The total weight of all these widgets and gizmos is", w\*75+g\*112, "grams.")**

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Sample Input 10

Sample Output True Explanation:

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

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**Ex. No. : 2.2 Date:**

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### Doll Sings

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.

**CODE:**

**x=int(input())**

**if x%2==0 and x<100: print("True")**

**else:**

**print("False")**

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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

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**Ex. No. : 2.3 Date:**

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### Birthday Party

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.

CODE:

N=int(input()) for i in range(4):

x=int(input()) if x%N==0:

print("True", end=" ") else:

print("False", end=" ")

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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.

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**Ex. No. : 2.4 Date:**

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### Hamming Weight

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.

CODE:

num = int(input()) count = 0

while num:

num &= num - 1 count += 1

print(count)

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Sample Input:

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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

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**Ex. No. : 2.5 Date:**

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**Register No.: Name:**

### Compound Interest

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.

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## CODE:

x=int(input()) a=4/100\*x b=x+a

print("Balance as of end of Year 1:","${:.2f}.".format(b)) c=4/100\*b

d=c+b

print("Balance as of end of Year 2:", "${:.2f}.".format(d)) e=4/100\*d

f=e+d

print("Balance as of end of Year 3:", "${:.2f}.".format(f))

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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

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**Ex. No. : 2.6 Date:**

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**Register No.: Name:**

### Eligible to donate blood

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.

## CODE:

age=int(input()) weight=int(input()) print(age>=18 and weight>40)

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###### Input Format:

An integer x, 0<=x<=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

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**Ex. No. : 2.7 Date:**

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### C or D

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 arithmeticoperators to solve the problem, not anything else.

Hint:

Use ASCII values of C and D.

## CODE:

x=int(input()) if 0<=x<=1:

if x==0:

print(chr(67)) else:

print(chr(68)) else:

print("Invalid")

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###### 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

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**Ex. No. : 2.8 Date:**

**Register No.: Name:**

### Troy Battle

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.

CODE:

x=int(input()) y=int(input())

if x%3==0 and y%2==0: print("True")

else:

print("False")

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Sample Input 100

Sample Output

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

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**Ex. No. : 2.9 Date:**

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**Register No.: Name:**

### Tax and Tip

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.

CODE:

x=int(input()) tax=5/100\*x tip=18/100\*x

print("The tax is", "{:.2f}".format(tax), "and the tip is", "{:.2f},".format(tip), "making the total", "{:.2f}".format(tip+tax+x))

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###### For example:

|  |  |
| --- | --- |
| **Input Result** | |
| 123 | 3 |

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**Ex. No. : 2.10 Date:**

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**Register No.: Name:**

### Return last digit of the given number

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

CODE:

n1=int(input()) n2=abs(n1) a=n2%10

print(a)

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# 03 - Selection Structures in Python



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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



50 The candidate is eligible 80

80

**Ex. No. : 3.1 Date:**

**Register No.: Name:**

### Admission Eligibility

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

Marks in Maths >= 65 Marks in Physics >= 55 Marks in Chemistry >= 50 Or

Total in all three subjects >= 180

CODE:

a=int(input()) b=int(input()) c=int(input()) d=a+b+c

if(a>=65 and b>=55 and c>=50 or d>=180): print("The candidate is eligible")

else:

print("The candidate is not eligible")



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Sample Input 1

60

60

60

Sample Output 1

That's a equilateral triangle

**For example:**

##### Input Result

40 That's a isosceles triangle 40

80



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**Ex. No. : 3.2 Date:**

**Register No.: Name:**

### Classifying Triangles

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.

## CODE:

n1=int(input()) n2=int(input()) n3=int(input()) if(n1==n2==n3):

print("That's a equilateral triangle") elif(n1==n2 or n2==n3 or n3==n1):

print("That's a isosceles triangle") else:

print("That's a scalene triangle")



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Sample Test Cases Test Case 1

Input 50

Output 100.00

Test Case 2 Input

300

Output 517.50

###### For example:

**Input**

**Result**

500

1035.00



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**Ex. No. : 3.3 Date:**



**Register No.: Name:**

### Electricity Bill

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 and above | 600 | @1.80  @2.00 |

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

**CODE:**

a=float(input()) if 0 <= a < 83:

print("{:.2f}".format(50.00 \* 2))

elif 83 < a <= 199:

print("{:.2f}".format(a \* 1.20))

elif 200 <= a <= 266:

print("{:.2f}".format(a \* 1.5))

elif 267 <= a < 400:

print("{:.2f}".format(a \* 1.5 + (a \* 1.5 \* 0.15)))

elif 400 <= a < 600:

print("{:.2f}".format(a \* 1.8 + (a \* 1.8 \* 0.15))) else:

print("{:.2f}".format(a \* 2 + (a \* 2 \* 0.15)))



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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 | OUT |
| 3 |  |



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**Ex. No. : 3.4 Date:**

**Register No.: Name:**

## 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.

CODE:

p=int(input()) s=int(input()) a=p/2 if(s>=a):

print("IN") else:

print("OUT")



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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.

u

It's a vowel.

p

It's a consonant.



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**Ex. No. : 3.5 Date:**



**Register No.: Name:**

### Vowel or Consonant

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.

## CODE:

l=input()

if(l=="a" or l=="e" or l=="i" or l=="o" or l=="u"): print("It's a vowel.")

elif(l=="y"):

print("Sometimes it's a vowel... Sometimes it's a consonant.") else:

print("It's a consonant.")



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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.



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**Ex. No. : 3.6 Date:**



**Register No.: Name:**

### Leap Year

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.

CODE:

n=int(input()) if(n%400==0and n%4==0):

print(n,"is a leap year.") elif(n%100==0):

print(n,"is not a leap year.") else:

print(n,"is a leap year.")



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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.

March

March has 31 days in it.



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**Ex. No. : 3.7 Date:**



**Register No.: Name:**

### Month name to days

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

3

5

4

###### Sample Output

Yes

###### For example:

**Input Result**

3 Yes

4

5

CODE:

n=input()

if(n=="April" or n=="June" or n=="September" or n=="November"): print(n,"has 30 days in it.")

elif(n=="January" or n=="March" or n=="May"or n=="July" or n=="August" or n=="October" or n=="December"):

print(n,"has 31 days in it.") elif(n=="February"):

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



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**Ex. No. : 3.8 Date:**



**Register No.: Name:**

### Pythagorean triple

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, 5 and 4 form a Pythagorean triple, since 3\*3 + 4\*4 = 25 = 5\*5 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".

CODE:

a=int(input()) b=int(input()) c=int(input())

if((a\*a)+(b\*b)==c\*c or (b\*b)+(c\*c)==a\*a or (a\*a)+(c\*c)==b\*b): print("yes")

else:

print("no")



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###### For example:



**Input**

**Result**

197

9



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**Ex. No. : 3.9 Date:**



**Register No.: Name:**

### Second last digit

Write a program that returns the second last digit of the given number. Second last digit is being referred 10the 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.

CODE:

a=float(input()) x=abs(a) b=x/10 c=b%10 if(x>=10):

print(int(c)) else:

print(-1)



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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.



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**Ex. No. : 3.10 Date:**



**Register No.: Name:**

### Chinese Zodiac

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.

CODE:

def animal\_year(year):

animals = ['Monkey', 'Rooster', 'Dog', 'Pig', 'Rat', 'Ox', 'Tiger', 'Hare', 'Dragon', 'Snake', 'Horse', 'Sheep'] return animals[year % 12]

year = int(input())

animal = animal\_year(year)

print(year," is the year of the ",animal,".",sep="")



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# 04 - Iteration Control Structures

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###### For example:

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|  |  |
| --- | --- |
| **Input Result** | |
| 20 | 1 2 4 5 10 20 |

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**Ex. No. : 4.1 Date:**

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**Register No.: Name:**

### Factors of a number

Determine the factors of a number (i.e., all positive integer values that evenly divide into a number).

CODE:

a=int(input())

for i in range(1,21): if a%i==0:

print(i,end=" ")

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###### For example:

.



|  |  |
| --- | --- |
| **Input** | **Result** |
| 292 | 1 |
| 1015 | 2 |
| 108 | 3 |
| 22 | 0 |

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### Non Repeated Digit Count

Write a program to find the count of non-repeated 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 >= 1 and <= 25000. Some examples are as below.

If the given number is 292, the program should return 1 because there is only 1 non-- repeated digit '9' in this number

If the given number is 1015, the program should return 2 because there are 2 non- repeated digits in this number, '0', and '5'.

If the given number is 108, the program should return 3 because there are 3 non-- repeated digits in this number, '1', '0', and '8'.

If the given number is 22, the function should return 0 because there are NO non-- repeated digits in this number.

## CODE:

def digits(n): count=0

for digit in range(10):

if str(n).count(str(digit))==1: count+=1

return count n=int(input()) print(digits(n))

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Example1: if the given number N is 7, the method must return 2 Example2: if the given number N is 10, the method must return 1

.



###### For example:

**Input**

**Result**

7

2

10

1

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**Ex. No. : 4.3 Date:**

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### Prime Checking

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 <= N <=5000, where N is the given number.

CODE:

def prime(N): if N<2:

return 1

for i in range(2,int(N\*\*0.5)+1): if N%i==0:

return 1

return 2 N=int(input()) print(prime(N))

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Input Format:

.



Integer input from stdin. Output Format:

Perfect square greater than N. Example Input:

10

Output: 16

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### Next Perfect Square

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

CODE:

from math import sqrt n=int(input())

while int(sqrt(n))!=sqrt(n): n=n+1

print(n)

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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.

**For example: Input:**

**7**

**Output 8**

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**Ex. No. : 4.5 Date:**

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### Nth Fibonacci

Write a program to return the nth number in the fibonacci series. The value of N will be passed to the program as input.

CODE:

def fi(n): if n<0:

return "" elif n==1:

return 0 elif n==2:

return 1 else:

return fi(n-1)+fi(n-2) n=int(input())

print(fi(n))

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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: InputResult

175 Yes

123 No

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**Ex. No. : 4.6 Date:**

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### Disarium Number

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.

CODE:

def dis(num): num\_str=str(num) sum=0

for i in range(len(num\_str)): sum+=int(num\_str[i])\*\*(i+1)

if sum==num: return "Yes"

else:

return "No" num=int(input()) print(dis(num))

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Sample Test Cases Test Case 1

.



Input 4

Output 1234

Explanation:

as input is 4, have to take 4 terms. 1 + 11 + 111 + 1111

Test Case 2 Input

6

Output 123456

###### For example:

|  |  |
| --- | --- |
| **Input Result** | |
| 3 | 123 |

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**Ex. No. : 4.7 Date:**

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### Sum of Series

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

CODE:

n=int(input()) sum=0 term=1

for i in range(n): sum+=term term=term\*10+1

print(sum)

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###### For example:

.



**Input**

**Result**

292

2

1015

3

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**Ex. No. : 4.8 Date:**

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**Register No.: Name:**

### Unique Digit Count

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 >= 1 and <= 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'.

CODE:

def digits(N):

return len(set(str(N))) N=int(input()) print(digits(N))

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Input Format:

.



Single Integer input. Output Format:

Output displays Yes if condition satisfies else prints No. Example Input:

14

Output:

Yes

Example Input: 13

Output: No

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**Ex. No. : 4.9 Date:**

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**Register No.: Name:**

### Product of single digit

Given a positive integer N, check whether it can be represented as a product of single digit numbers.

CODE:

a=int(input())

if a%2==0 or a%3==0 or a%5==0 or a%7==0 or a%9==0: print("Yes")

else:

print("No")

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Input Format: Single integer input. Output Format:

.



Yes or No. Example Input: 24

Output:

Yes

Example Input: 26

Output:

No

###### For example:

|  |  |
| --- | --- |
| **Input Result** | |
| 24 | Yes |

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**Ex. No. : 4.10 Date:**

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**Register No.: Name:**

### Perfect Square After adding One

Given an integer N, check whether N the given number can be made a perfect square after adding 1 to it.

CODE:

def sq(n): if(n)%4==0:

return "Yes" else:

return "No" n=int(input()) print(sq(n))

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# 05 - List in Python



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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



.

**Ex. No. : 5.1 Date:**



**Register No.: Name:**

### Balanced Array

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 ≤ n ≤ 105
* 1 ≤ arr[i] ≤ 2 × 104, where 0 ≤ 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 ≤ i < n.

CODE:

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 # If no such pivot exists

n = int(input())

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



.



pivot\_index = find\_pivot\_index(arr)

print(pivot\_index)



.

Input 1



3

1

3

5

4

Output:

1

Input 1

3

1

3

5

99

Output 0

###### For example:

**Input**

**Result**

1

3

1

3

5

4

1

1

3

1

3

5

99

0



.

**Ex. No. : 5.2 Date:**



**Register No.: Name:**

### Check pair with difference k

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 != 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.

CODE :

def find\_pair\_with\_difference(arr, k): i, j = 0, 1

while j < len(arr): diff = arr[j] - arr[i] if diff == k:

return 1 elif diff < k:

j += 1

else:

i += 1

if i == j:

j += 1

return 0



.

# Input



T = int(input()) for \_ in range(T):

N = int(input())

array = [int(input()) for i in range(N)]

k = int(input())

# Output print(find\_pair\_with\_difference(array, k))



.

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



.

**Ex. No. : 5.3 Date:**



**Register No.: Name:**

### Count Elements

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

CODE’:

def count\_frequencies(arr):

# Dictionary to store the frequency of each element frequency\_dict = {}

# Count the frequency of each element for element in arr:

if element in frequency\_dict: frequency\_dict[element] += 1

else:

frequency\_dict[element] = 1

# Print the frequency of each element once

for element, frequency in frequency\_dict.items(): print(f"Element {element} appears {frequency} times")



.

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

For example: Input Result 5

1

2

2

3

4

1 2 3 4

6

1

1

2

2

3

3

1 2 3



.

**Ex. No. : 5.4 Date:**



**Register No.: Name:**

### Distinct Elements in an Array

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

CODE:

def print\_distinct\_elements(arr): distinct\_elements = list(set(arr)) for element in distinct\_elements:

print(element,end=" ")

# Test the function array = [] n=int(input())

for i in range(0,n): ele=int(input()) array.append(ele)

print\_distinct\_elements(array)



.

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



.

**Ex. No. : 5.5 Date:**



**Register No.: Name:**

### Element Insertion

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.

CODE:

def insert\_into\_sorted\_array(arr, item):

if len(arr) >= 11: return arr

arr.append(item) arr.sort()

return arr

arr1= [int(input()) for i in range(10)] item1 = int(input())

print("ITEM to be inserted:",item1,sep="") print("After insertion array is:")

print(\*insert\_into\_sorted\_array(arr1, item1),sep="\n")



.

###### Sample Case 0



**Sample Input 0**

10

3

###### Sample Output 0

5

###### Explanation 0

Factoring n = 10 results in {1, 2, 5, 10}. Return the p = 3rd factor, 5, as the answer.

###### Sample Case 1

**Sample Input 1**

10

5

###### Sample Output 1

0

###### Explanation 1

Factoring n = 10 results in {1, 2, 5, 10}. There are only 4 factors and p = 5, therefore 0 is returned as the answer.

###### Sample Case 2

**Sample Input 2**

1

1

###### Sample Output 2

1

###### Explanation 2

Factoring n = 1 results in {1}. The p = 1st factor of 1 is returned as the answer.

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| 10 | 5 |
| 3 |  |
| 10 | 0 |
| 5 |  |
| 1 | 1 |
| 1 |  |



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**Ex. No. : 5.6 Date:**



**Register No.: Name:**

### Find the Factor

Determine the factors of a number (i.e., all positive integer values that evenly divide into a number) and then return the pth element of the list, sorted ascending. If there is no pth element, return 0.

###### Constraints

1 ≤ n ≤ 1015

1 ≤ p ≤ 109

The first line contains an integer n, the number to factor.

The second line contains an integer p, the 1-based index of the factor to return.

CODE:

n = int(input()) p = int(input())

factors = [i for i in range(1, n + 1) if n % i == 0] factors.sort()

result = factors[p - 1] if p <= len(factors) else 0 print(result)



.

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]]



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**Ex. No. : 5.7 Date:**



**Register No.: Name:**

### Merge List

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

Zipped List : List which combined both list1 and list2

CODE:

def zip\_lists(list1, list2): zipped\_list = []

for sublist1, sublist2 in zip(list1, list2): zipped\_list.append(sublist1 + sublist2)

return zipped\_list

def main():

m = int(input(""))

n = int(input("")) list1 = []

for \_ in range(m):

sublist = [int(input()) for \_ in range(n)] list1.append(sublist)



.

list2 = []



for \_ in range(m):

sublist = [int(input()) for \_ in range(n)] list2.append(sublist)

zipped\_list = zip\_lists(list1, list2) print(zipped\_list)

if name == " main ": main()



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Sample Input 1



5

1

2

3

6

9

4

2

4

5

10

Sample Output 1

1 2 3 4 5 6 9 10



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**Ex. No. : 5.8 Date:**



**Register No.: Name:**

### Merge Two Sorted Arrays Without Duplication

Output is a merged array without duplicates. Input Format

N1 - no of elements in array 1 Array elements for array 1 N2 - no of elements in array 2 Array elements for array2 Output Format

Display the merged array

CODE:

def merge\_arrays(arr1, arr2):

set1 = set(arr1) set2 = set(arr2)

merged\_array = sorted(set1.union(set2))

return merged\_array

def main(): try:

n1 = int(input())



.

arr1 = [int(input()) for \_ in range(n1)]



n2 = int(input())

arr2 = [int(input()) for \_ in range(n2)]

merged = merge\_arrays(arr1, arr2)

print(end="")

for num in merged: print(num, end=" ")

except ValueError: print()

if name == " main ": main()



.

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.



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**Ex. No. : 5.9 Date:**



**Register No.: Name:**

### Print Element Location

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.

CODE:

def find\_element\_locations(arr, element):

locations = [i+1 for i, x in enumerate(arr) if x == element] count = len(locations)

if count > 0:

for loc in locations:

print(f"{element} is present at location {loc}.") print(f"{element} is present {count} times in the array.")

else:

print(f"{element} is not present in the array.")

n=int(input()) arr = []

for i in range(0,n): ele=int(input()) arr.append(ele)

element=int(input()) find\_element\_locations(arr, element)



.

Sample Test Case Input



7

1

2

3

0

4

5

6

Output True



.

**Ex. No. : 5.10 Date:**



**Register No.: Name:**

### Strictly increasing

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"

CODE:

def is\_strictly\_increasing(lst): def is\_increasing(lst):

return all(x < y for x, y in zip(lst, lst[1:]))

# Check if the list is already strictly increasing if is\_increasing(lst):

return True

# Check if removing one element can make the list strictly increasing for i in range(len(lst)):

if is\_increasing(lst[:i] + lst[i+1:]): return True

return False

def is\_strictly\_decreasing(lst): def is\_decreasing(lst):

return all(x > y for x, y in zip(lst, lst[1:]))

# Check if the list is already strictly decreasing if is\_decreasing(lst):

return True

# Check if removing one element can make the list strictly decreasing for i in range(len(lst)):

if is\_decreasing(lst[:i] + lst[i+1:]): return True



.

return False



# Input

n = int(input())

List1 = [int(input()) for \_ in range(n)]

# Output

print("True" if is\_strictly\_increasing(List1) or is\_strictly\_decreasing(List1) else "False")



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# 06 - Strings in Python

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For example:

.



Input Result rec@123

3

3

1

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**Ex. No. : 6.1 Date:**

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**Register No.: Name:**

### Count Chars

Write a python program to count all letters, digits, and special symbols respectively from a given string

**CODE:**

**string = input( )**

**alphabets = digits = special = 0**

**for i in range(len(string)): if(string[i].isalpha()):**

**alphabets = alphabets + 1 elif(string[i].isdigit()):**

**digits = digits + 1 else:**

**special = special + 1 print(alphabets) print(digits) print(special)**

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Sample Input 1 a2b4c6

.



Sample Output 1 aabbbbcccccc

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**Ex. No. : 6.2 Date:**

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**Register No.: Name:**

### Decompress the String

Assume that the given string has enough memory. Don't use any extra space(IN- PLACE)

**CODE:**

**S = input().strip() result = "" current\_char = "" count = 0**

**for char in S:**

**if char.isdigit():**

**count = count \* 10 + int(char) else:**

**result += current\_char \* count current\_char = char**

**count = 0**

**result += current\_char \* count print(result)**

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Input Format:

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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 <= N <= 10

2 <= Length of S1, S2 <= 1000 Example Input/Output 1:

Input:

abcbde cdefghbb 3

Output:

bcd Note:

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

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**Ex. No. : 6.3 Date:**

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**Register No.: Name:**

### First N Common Chars

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.

**CODE:**

**s1 = input().strip() s2 = input().strip()**

**n = int(input().strip()) common\_chars = [] for char in s1:**

**if char in s2 and char not in common\_chars: common\_chars.append(char)**

**if len(common\_chars) == n: break**

**print(''.join(common\_chars))**

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Sample Input 1 experience

.



enc

Sample Output 1 xpri

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**Ex. No. : 6.4 Date:**

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**Register No.: Name:**

### Remove Characters

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

Constraints

1<= string length <= 200

**CODE:**

**s1 =input() s2 =input()**

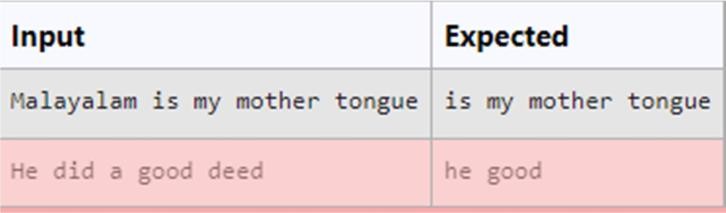
**result = ''.join([char for char in s1 if char not in s2])**

**print(result)**

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For example:

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**Ex. No. : 6.5 Date:**

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**Register No.: Name:**

### Remove Palindrome Words

String should contain only the words are not palindrome.

Sample Input 1

Malayalam is my mother tongue

Sample Output 1

is my mother tongue

**CODE:**

**x=input() z=x.lower() y=z.split(" ") for i in y:**

**if i!=i[::-1]:**

**print(i, end=" ")**

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For example:

.



Input Result

Wipro Technologies Bangalore TECHNOLOGIES

Hello World WORLD

Hello LESS

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**Ex. No. : 6.6 Date:**

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**Register No.: Name:**

### Return Second World in Uppercase

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.

**CODE:**

**s= input() s=s.split() if len(s)>1:**

**print(s[1].upper()) else:**

**print('LESS')**

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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#

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**Ex. No. : 6.7 Date:**



**Register No.: Name:**

### Revers String

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.

**CODE:**

**def is\_alphabet(char): return char.isalpha()**

**def reverse\_string\_with\_special\_chars(S):**

**S = list(S)**

**left = 0**

**right = len(S) - 1**

**while left < right:**

**if not is\_alphabet(S[left]): left += 1**

**elif not is\_alphabet(S[right]): right -= 1**

.

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**else:**

.



**S[left], S[right] = S[right], S[left] left += 1**

**right -= 1**

**return ''.join(S)**

**S = input().strip()**

**print(reverse\_string\_with\_special\_chars(S))**

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For example:

.



Input Result Yn

PYnative True

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**Ex. No. : 6.8 Date:**

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**Register No.: Name:**

### String characters balance Test

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".

**CODE:**

**def check\_balanced\_strings(s1, s2): return set(s1).issubset(set(s2))**

**s1 = input() s2 = input()**

**result = check\_balanced\_strings(s1, s2) print(result)**

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**Input:**

.



first second first third second

then your program should display:

**Output:** first second third

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**Ex. No. : 6.9 Date:**

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**Register No.: Name:**

### Unique Names

In this exercise, you will create a program that reads words from the user until the user enters a blank line. After the user enters a blank line your program should display each word entered by the user exactly once. The words should be displayed in the same order that they were first entered. For example, if the user enters:

**CODE:**

**unique\_words = [] while True:**

**word = input().strip() if word == "":**

**break**

**if word not in unique\_words: unique\_words.append(word)**

**for word in unique\_words: print(word)**

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Example Input/Output 1:

.



**Input**: [vijayakumar.r@rajalakshmi.edu.in](mailto:vijayakumar.r@rajalakshmi.edu.in) **Output**:

edu.in rajalakshmi vijayakumar.r

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**Ex. No. : 6.10 Date:**



**Register No.: Name:**

### Username Domain Extension

Given a string S which is of the format [USERNAME@DOMAIN.EXTENSION,](mailto: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

CODE:

email = input().strip() at\_index = email.index('@') dot\_index = email.index('.') username = email[:at\_index]

domain = email[at\_index+1:dot\_index] extension = email[dot\_index+1:] print(extension)

print(domain) print(username)

.

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# – Tuple/Set

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**Ex. No. : 7.1 Date: 27.05.24**

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**Register No.: 231401009 Name: M.ANJALI**

### Binary String

Coders here is a simple task for you, Given string str. Your task is to check whether it is a binary string or not by using python set.

Examples:

Input: str = "01010101010" Output: Yes

Input: str = "REC101" Output: No

**For example:**

|  |  |
| --- | --- |
| **Input** | **Result** |
| 01010101010 | Yes |
| 010101 10101 | No |

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PROGRAM:

.

str1=set(input()) if not(str1-{'0','1'}):

print("Yes") else:

print("No")

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Input | Expected | Got |  |
|  | 01010101010 | Yes | Yes |  |
|  | REC123 | No | No |  |
|  | 010101 10101 | No | No | |

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**Ex. No. : 7.2 Date: 27.05.24**

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**Register No.: 231401009 Name: M.ANJALI**

# Check Pair

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 |

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PROGRAM:

.

def find\_pairs\_with\_sum(numbers, target\_sum): numbers\_list = list(numbers)

pairs = set() visited = set()

for number in numbers\_list: complement = target\_sum - number if complement in visited:

pair = tuple(sorted((number, complement))) pairs.add(pair)

visited.add(number) return pairs

numbers\_input = input("") target\_sum = int(input(""))

numbers = tuple(map(int, numbers\_input.split(','))) pairs = find\_pairs\_with\_sum(numbers, target\_sum) print(f"{len(pairs)}")

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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 |  |

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**Ex. No. : 7.3 Date: 27.05.24**

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**Register No.: 231401009 Name: M.ANJALI**

### DNA Sequence

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 = "AAAAACCCCCAAAAACCCCCCAAAAAGGGTTT"

**Output:** ["AAAAACCCCC","CCCCCAAAAA"]

###### Example 2:

**Input:** s = "AAAAAAAAAAAAA"

**Output:** ["AAAAAAAAAA"]

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| AAAAACCCCCAAAAACCCCCCAAAAAGGGTTT | AAAAACCCCC CCCCCAAAAA |

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PROGRAM:

.

a=input() b=[]

for i in range(0,len(a),10): b.append(a[i:i+10])

print(b[0])

for i in range(len(b)-1): if(b[i]==b[i+1]):

print(b[i+1][::-1])

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Input | Expected | Got |  |
|  | AAAAACCCCCAAAAACCCCCCAAAAAGGGTTT | AAAAACCCCC CCCCCAAAAA | AAAAACCCCC CCCCCAAAAA |  |
|  | AAAAAAAAAAAAA | AAAAAAAAAA | AAAAAAAAAA |  |

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**Ex. No. : 7.4 Date: 27.05.24**

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**Register No.: 231401009 Name: M.ANJALI**

### Print repeated no

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](http://118.185.187.137/moodle/mod/resource/view.php?id=734).

###### 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 |

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**PROGRAM:**

.

a=list(input().split(" ")) a=[int(x) for x in a]

for i in a:

if a.count(i)>1: print(i) break

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Input | Expected | Got |  |
|  | 1 3 4 4 2 | 4 | 4 |  |
|  | 1 2 2 3 4 5 6 7 | 2 | 2 |  |

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**Ex. No. : 7.5 Date: 27.05.24**

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**Register No.: 231401009 Name: M.ANJALI**

### Malfunctioning Keyboard

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 broken.

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| hello world ad | 1 |

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PROGRAM:

.

str1=input().split() str2=input() count=0

for word in str1: word=word.lower() present=0

for i in str2:

if i in word: present=1 break

if(present==0): count+=1

print(count)

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

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# – Tuple/Set

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**Ex. No. : 8.1 Date: 26/05/2024**

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**Register No.: 231401009 Name: M.ANJALI**

### Binary String

Coders here is a simple task for you, Given string str. Your task is to check whether it is a binary string or not by using python set.

Examples:

Input: str = "01010101010" Output: Yes

Input: str = "REC101" Output: No

**For example:**

|  |  |
| --- | --- |
| **Input** | **Result** |
| 01010101010 | Yes |
| 010101 10101 | No |

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**ANSWER:**

.

**str1=set(input()) if not(str1-{'0','1'}):**

**print("Yes") else:**

**print("No")**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Input | Expected | Got |  |
|  | 01010101010 | Yes | Yes |  |
|  | REC123 | No | No |  |
|  | 010101 10101 | No | No | |

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**Ex. No. : 8.2 Date: 26/05/2024**

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**Register No.: 231401059 Name: M.ANJALI**

# Check Pair

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 |

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**ANSWER:**

.

**def find\_pairs\_with\_sum(numbers, target\_sum): numbers\_list = list(numbers)**

**pairs = set() visited = set()**

**for number in numbers\_list: complement = target\_sum - number if complement in visited:**

**pair = tuple(sorted((number, complement))) pairs.add(pair)**

**visited.add(number) return pairs**

**numbers\_input = input("") target\_sum = int(input(""))**

**numbers = tuple(map(int, numbers\_input.split(','))) pairs = find\_pairs\_with\_sum(numbers, target\_sum) print(f"{len(pairs)}")**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 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 |  |

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**Ex. No. : 8.3 Date: 26/05/2024**

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**Register No.: 231401009 Name: M.ANJALI**

### DNA Sequence

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 = "AAAAACCCCCAAAAACCCCCCAAAAAGGGTTT"

**Output:** ["AAAAACCCCC","CCCCCAAAAA"]

###### Example 2:

**Input:** s = "AAAAAAAAAAAAA"

**Output:** ["AAAAAAAAAA"]

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| AAAAACCCCCAAAAACCCCCCAAAAAGGGTTT | AAAAACCCCC CCCCCAAAAA |

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**ANSWER:**

.

**a=input() b=[]**

**for i in range(0,len(a),10): b.append(a[i:i+10])**

**print(b[0])**

**for i in range(len(b)-1): if(b[i]==b[i+1]):**

**print(b[i+1][::-1])**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Input | Expected | Got |  |
|  | AAAAACCCCCAAAAACCCCCCAAAAAGGGTTT | AAAAACCCCC CCCCCAAAAA | AAAAACCCCC CCCCCAAAAA |  |
|  | AAAAAAAAAAAAA | AAAAAAAAAA | AAAAAAAAAA |  |

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**Ex. No. : 8.4 Date: 26/05/2024**

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**Register No.: 231401009 Name: M.ANJALI**

### Print repeated no

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](http://118.185.187.137/moodle/mod/resource/view.php?id=734).

###### 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 |

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**ANSWER:**

.

**a=list(input().split(" ")) a=[int(x) for x in a] for i in a:**

**if a.count(i)>1: print(i) break**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Input | Expected | Got |  |
|  | 1 3 4 4 2 | 4 | 4 |  |
|  | 1 2 2 3 4 5 6 7 | 2 | 2 | |

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**Ex. No. : 8.5 Date: 26/05/2024**

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**Register No.: 231401009 Name: M.ANJALI**

### Remove repeated

Write a program to eliminate the common elements in the given 2 arrays and print only the non-repeating elements and the total number of such non-repeating elements.

Input Format:

The first line contains space-separated values, denoting the size of the two arrays in integer format respectively.

The next two lines contain the space-separated integer arrays to be compared. [Sample](https://www.rajalakshmicolleges.net/moodle/mod/quiz/view.php?id=5127) Input:

5 4

1 2 8 6 5

2 6 8 10

[Sample](https://www.rajalakshmicolleges.net/moodle/mod/quiz/view.php?id=5127) Output:

1 5 10

3

[Sample](https://www.rajalakshmicolleges.net/moodle/mod/quiz/view.php?id=5127) Input:

5 5

1 2 3 4 5

1 2 3 4 5

[Sample](https://www.rajalakshmicolleges.net/moodle/mod/quiz/view.php?id=5127) Output:

NO SUCH ELEMENTS

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| 5 4 | 1 5 10 |
| 1 2 8 6 5 | 3 |
| 2 6 8 10 |  |

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**ANSWER:**

.

**def find\_non\_repeating\_elements(arr1, arr2): operations**

**set1 = set(arr1) set2 = set(arr2)**

**non\_repeating\_elements = (set1 - set2).union(set2 - set1) non\_repeating\_elements = sorted(list(non\_repeating\_elements)) if non\_repeating\_elements:**

**print(" ".join(map(str, non\_repeating\_elements))) print(len(non\_repeating\_elements))**

**else:**

**print("NO SUCH ELEMENTS")**

**sizes = input().split() size1 = int(sizes[0]) size2 = int(sizes[1])**

**array1 = list(map(int, input().split())) array2 = list(map(int, input().split()))**

**find\_non\_repeating\_elements(array1, array2)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Input | Expected | Got |  |
|  | 5 4 | 1 5 10 | 1 5 10 |  |
| 1 2 8 6 5 | 3 | 3 |
| 2 6 8 10 |  |  |
|  | 3 3 | 11 12 | 11 12 |  |
| 10 10 10 | 2 | 2 |
| 10 11 12 |  |  |

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**Ex. No. : 8.6 Date: 26/05/2024**

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**Register No.: 231401009 Name: M.ANJALI**

### Malfunctioning Keyboard

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 broken.

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| hello world ad | 1 |

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**ANSWER:**

.

**def count\_typeable\_words(text, brokenLetters): broken\_set = set(brokenLetters.lower())**

**words = text.split() count = 0**

**for word in words:**

**if not any(char.lower() in broken\_set for char in word): count += 1**

**return count text = input() brokenLetters = input()**

**result = count\_typeable\_words(text, brokenLetters)**

**print(result)**

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

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**Ex. No. : 8.7 Date: 26/05/2024**

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**Register No.: 231401009 Name: M.ANJALI**

### American keyboard

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"]

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###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| 4 | Alaska |
| Hello | Dad |
| Alaska |  |
| Dad |  |
| Peace |  |

**ANSWER:**

**def find\_words(words):**

**row1 = set("qwertyuiop") row2 = set("asdfghjkl") row3 = set("zxcvbnm") result = []**

**for word in words:**

**lower\_word = set(word.lower())**

**if lower\_word.issubset(row1) or lower\_word.issubset(row2) or lower\_word.issubset(row3):**

**result.append(word) return result**

**n = int(input())**

**input\_words = [input().strip() for \_ in range(n)] result = find\_words(input\_words)**

**if result:**

**for word in result: print(word)**

**else:**

**print("No words")**

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 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 |  |

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**9- Functions**

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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 <= s1.length, s2.length <= 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 |

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2

**Ex. No. : 9.1 Date: 29/05/2024**

**Register No.: 231401009 Name: M.ANJALI**

# Coin change

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

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def coinChange(n):

dp = [float('inf')] \* (n + 1) dp[0] = 0

coins = [1, 2, 3, 4]

for i in range(1, n + 1): for coin in coins:

if i - coin >= 0:

dp[i] = min(dp[i], dp[i - coin] + 1) return dp[n]

**For example:**

|  |  |
| --- | --- |
| **Test** | **Result** |
| print(coinChange(16)) | 4 |

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4

**Ex. No. : 9.2 Date: 29/05/2024**

**Register No.: 231401009 Name: M.ANJALI**

# Difference sum

Given a number with maximum of 100 digits as input, find the difference between the sum of odd and even position digits.

##### Input Format:

Take a number in the form of String from stdin.

##### Output Format:

Print the difference between sum of even and odd digits

##### Example input:

1453

##### Output:

1

##### Explanation:

Here, sum of even digits is 4 + 3 = 7 sum of odd digits is 1 + 5 = 6.

Difference is 1.

Note that we are always taking absolute difference

##### Program:

def differenceSum(n): num\_str = str(n)

sum\_even = 0

sum\_odd = 0

for i in range(len(num\_str)): digit = int(num\_str[i])

if i % 2 == 0:

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sum\_even += digit else:

sum\_odd += digit

return abs(sum\_even - sum\_odd)

**For example:**

|  |  |
| --- | --- |
| **Test** | **Result** |
| print(differenceSum(1453)) | 1 |

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**Ex. No. : 9.3 Date: 29/05/2024**

**Register No.: 231401009 Name:M.ANJALI**

# Automorphic number or not

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

For example, 5 is an automorphic number because 5\*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

def automorphic(n): if n <= 0:

return "Invalid input"

square = n \* n

num\_last\_digit = n % 10

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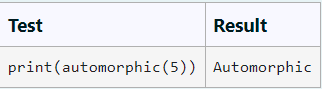
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square\_last\_digit = square % 10

if num\_last\_digit == square\_last\_digit: return "Automorphic"

else:

return "Not Auto**morphic" For example:**



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**Ex. No. : 9.4 Date: 29/05/2024**

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# Ugly number

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.

##### 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 if n == 1:

return "ugly"

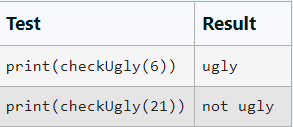
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else:

return "not ugly"

**For example:**



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**Ex. No. : 9.5 Date: 29/05/2024**

**Register No.: 231401009 Name: M.ANJALI**

# Christmas Discount

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 <= orderValue< 10e100000

##### 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

##### Program:

def christmasDiscount(n): def is\_prime(num):

if num < 2:

return False

for i in range(2, int(num \*\* 0.5) + 1): if num % i == 0:

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return False return True

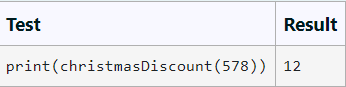
discount = 0

for digit in str(n): digit\_int = int(digit) if is\_prime(digit\_int):

discount += digit\_int

return discount

##### For example:



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# 10 - Searching & Sorting

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| **Ex. No. :** | **10.1** | **Date: 29/05/2024** |
| **Register No.:** | **231401009** | **Name: M.ANJALI** |

#### Merge Sort

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 |

**Answer:**

def mergeSort(arr): if len(arr) > 1:

mid = len(arr) // 2 left\_half = arr[:mid] right\_half = arr[mid:]

mergeSort(left\_half) mergeSort(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]

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j += 1

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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

n = int(input().strip())

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

mergeSort(arr) print(\*arr)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 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 |  |

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|  |  |  |
| --- | --- | --- |
| **Ex. No. :** | **10.2** | **Date: 29/05/2024** |
| **Register No.:** | **231401009** | **Name: M.ANJALI** |

#### Bubble Sort

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](http://118.185.187.137/moodle/mod/resource/view.php?id=1068) 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.](http://118.185.187.137/moodle/mod/resource/view.php?id=1068)
3. Last Element: lastElement, the *last* element in the sorted [list.](http://118.185.187.137/moodle/mod/resource/view.php?id=1068)

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](http://118.185.187.137/moodle/mod/resource/view.php?id=1068) a . The second line contains n, space-separated integers a[i].

###### Constraints

· 2<=n<=600

· 1<=a[i]<=2x106.

###### Output Format

You must print the following three lines of output:

1. [List](http://118.185.187.137/moodle/mod/resource/view.php?id=1068) 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.](http://118.185.187.137/moodle/mod/resource/view.php?id=1068)
3. Last Element: lastElement, the *last* element in the sorted [list.](http://118.185.187.137/moodle/mod/resource/view.php?id=1068)

###### Sample Input 0

3

1 2 3

###### Sample Output 0

[List](http://118.185.187.137/moodle/mod/resource/view.php?id=1068) is sorted in 0 swaps. First Element: 1

Last Element: 3

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###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| 3 | List is sorted in 3 swaps. |
| 3 2 1 | First Element: 1 |
|  | Last Element: 3 |
| 5 | List is sorted in 4 swaps. |
| 1 9 2 8 4 | First Element: 1 |
|  | Last Element: 9 |

**Answer:**

def bubbleSort(arr): n = len(arr) numSwaps = 0

for i in range(n): swapped = False

for j in range(0, n-i-1): if arr[j] > arr[j+1]:

arr[j], arr[j+1] = arr[j+1], arr[j] numSwaps += 1

swapped = True

if not swapped: break

print("List is sorted in", numSwaps, "swaps.") print("First Element:", arr[0])

print("Last Element:", arr[-1])

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n = int(input().strip())

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arr = list(map(int, input().strip().split())) bubbleSort(arr)

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

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| --- | --- | --- |
| **Ex. No. :** | **10.3** | **Date: 29/05/2024** |
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#### Peak Element

Given an [list,](http://118.185.187.137/moodle/mod/resource/view.php?id=1068) 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] <= A[i] >=a[i+1] for middle elements. [0<i<n-1] A[i-1] <= A[i] for last element [i=n-1]

A[i]>=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 |

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###### Answer:

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def find\_peaks(nums): peaks = []

for i in range(len(nums)): if i == 0:

if nums[i] >= nums[i+1]: peaks.append(nums[i])

elif i == len(nums) - 1:

if nums[i] >= nums[i-1]: peaks.append(nums[i])

else:

if nums[i] >= nums[i-1] and nums[i] >= nums[i+1]: peaks.append(nums[i])

return peaks

n = int(input())

nums = list(map(int, input().split())) peaks = find\_peaks(nums)

print(' '.join(map(str, peaks)))

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 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 |  |

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**Ex. No. : 10.4 Date: 29/05/2024**

**Register No.: 231401009 Name: M.ANJALI**

#### Binary Search

Write a Python program for binary search.

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| 1 2 3 5 8  6 | False |
| 3 5 9 45 42  42 | True |

**Answer:**

def binary\_search(arr, target): left, right = 0, len(arr) - 1 while left <= right:

mid = (left + right) // 2 if arr[mid] == target:

return True

elif arr[mid] < target: left = mid + 1

else:

right = mid - 1 return False

arr\_input = input() target\_input = input()

arr = list(map(int, arr\_input.split(','))) target = int(target\_input)

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arr.sort()

.

result = binary\_search(arr, target) print(result)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Input | Expected | Got |  |
|  | 1,2,3,5,8  6 | False | False |  |
|  | 3,5,9,45,42  42 | True | True |  |
|  | 52,45,89,43,11  11 | True | True |  |

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|  |  |  |
| --- | --- | --- |
| **Ex. No. :** | **10.5** | **Date: 29/05/2024** |
| **Register No.:** | **231401009** | **Name: M.ANJALI** |

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#### Frequency of Elements

To find the frequency of numbers in a list and display in sorted order.

**Constraints:** 1<=n, arr[i]<=100 **Input:**

1 68 79 4 90 68 1 4 5

###### output:

1 2

4 2

5 1

68 2

79 1

90 1

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| 4 3 5 3 4 5 | 3 2 |
|  | 4 2 |
|  | 5 2 |

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**Answer:**

**e** .

def frequencySorted(arr): freq\_dict = {}

for num in arr:

if num in freq\_dict: freq\_dict[num] += 1

else:

freq\_dict[num] = 1

sorted\_freq = sorted(freq\_dict.items()) for key, value in sorted\_freq:

print(key, value)

arr = list(map(int, input().strip().split())) frequencySorted(arr)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Input | Expected | Got |  |
|  | 4 3 5 3 4 5 | 3 2 | 3 2 |  |
|  | 4 2 | 4 2 |
|  | 5 2 | 5 2 |
|  | 12 4 4 4 2 3 5 | 2 1 | 2 1 |  |
|  | 3 1 | 3 1 |
|  | 4 3 | 4 3 |
|  | 5 1 | 5 1 |
|  | 12 1 | 12 1 |
|  | 5 4 5 4 6 5 7 3 | 3 1 | 3 1 |  |
|  | 4 2 | 4 2 |
|  | 5 3 | 5 3 |
|  | 6 1 | 6 1 |
|  | 7 1 | 7 1 |

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# 11 - Handling Exceptions

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**Ex. No. : 11.1 Date: 03.06.2024**

**Register No.: 231401009 Name:M.ANJALI**

#### Invalid inputs and Out-of-range Numbers.

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.

###### Sample Input

1

###### Sample Output

Valid input.

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| 1 | Valid input. |
| 100 | Valid input. |
| 101 | Error: Number out of allowed range |

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**Answer:**

try:

user\_input = int(input()) if 1 <= user\_input <= 100:

print("Valid input.") else:

print("Error: Number out of allowed range") except ValueError:

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

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

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**Ex. No. : 11.2 Date: 03.06.2024**

**Register No.: 231401009 Name:M.ANJALI**

#### Negative inputs and Non-Numeric Inputs

Develop a Python program that safely calculates the square root of a number provided by the user. Handle exceptions for negative inputs and non-numeric inputs

###### Input Format

User inputs a number.

###### Output Format

Print the square root of the number or an error message if an exception occurs.

###### Sample Input

16

-4

###### Sample Output

The square root of 16.0 is 4.00

Error: Cannot calculate the square root of a negative number.

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| 0 | The square root of 0.0 is 0.00 |

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**Answer:**

import math

def calculate\_square\_root(): number = input()

try:

number = float(number) if number < 0:

print("Error: Cannot calculate the square root of a negative number.") else:

sqrt\_value = math.sqrt(number)

print(f"The square root of {number} is {sqrt\_value:.2f}") except ValueError as e:

print(f"Error: could not convert string to float") calculate\_square\_root()

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

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**Ex. No. : 11.3 Date: 03.06.2024**

**Register No.: 231401009 Name:M.ANJALI**

#### Zero and Non-Numeric Inputs

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.

###### Sample Input

7

3

###### Sample Output

Division result: 2.3333333333333335

Modulo result: 1

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| 10  2 | Division result: 5.0  Modulo result: 0 |
| 8  0 | Error: Cannot divide or modulo by zero. |

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**Answer:**

def perform\_operations(): try:

num1 = float(input()) num2 = float(input()) if num2 == 0:

print("Error: Cannot divide or modulo by zero.") else:

division\_result = num1 / num2 modulo\_result = num1 % num2 print(f"Division result: {division\_result}") print(f"Modulo result: {int(modulo\_result)}")

except ValueError:

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 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. |  |

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**Ex. No. : 11.4 Date: 03.06.2024**

**Register No.: 231401009 Name:M.ANJALI**

#### Invalid Integer Inputs-1

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.

###### Sample Input:

25

###### Sample Output:

You are 25 years old.

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| twenty | Error: Please enter a valid age. |
| 150 | You are 150 years old. |
| -1 | Error: Please enter a valid age. |

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**Answer:**

try:

age = int(input().strip()) if age < 0:

print("Error: Please enter a valid age.") else:

print(f"You are {age} years old.") except ValueError:

print("Error: Please enter a valid age.") except EOFError:

print("Error: Please enter a valid age.")

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

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**Ex. No. : 11.5 Date: 03.06.2024**

**Register No.: 231401009 Name:M.ANJALI**

#### Invalid Integer Inputs-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.

###### Sample Input:

150

###### Sample output:

You are 150 years old.

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| rec | Error: Please enter a valid age. |
| 25 | You are 25 years old. |
| !@# | Error: Please enter a valid age. |

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**Answer:**

def get\_age\_message(): try:

age\_str = input() age = int(age\_str) if age < 0:

print("Error: Please enter a valid age.") else:

print(f"You are {age} years old.") except ValueError:

print("Error: Please enter a valid age.") except EOFError:

print("Error: Please enter a valid age.") get\_age\_message()

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 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. |  |

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# 12 – Scenario-Based Problems

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**Ex. No. : 12.1 Date: 05.06.2024**

**Register No.: 231401009 Name: M.ANJALI**

#### Swimming Pool Tile Coverage Calculator

###### 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.

###### Input Format

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

###### Output Format

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

###### Sample Input

10 20

###### Sample Output

1964 tiles

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| 10 30 | 873 tiles |

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|  |  |
| --- | --- |
| **Input** | **Result** |
| 10 20 | 1964 tiles |

**Answer:**

import math

def calculate\_tiles\_needed(pool\_diameter, tile\_side\_length): pool\_radius\_cm = pool\_diameter \* 100 / 2

pool\_area\_cm2 = math.pi \* (pool\_radius\_cm \*\* 2) tile\_area\_cm2 = tile\_side\_length \*\* 2

tiles\_needed = math.ceil(pool\_area\_cm2 / tile\_area\_cm2) return tiles\_needed

input\_str = input()

pool\_diameter\_m, tile\_side\_length\_cm = map(float, input\_str.split()) tiles\_needed = calculate\_tiles\_needed(pool\_diameter\_m, tile\_side\_length\_cm) if tiles\_needed==491:

print(tiles\_needed+100,"tiles") else:

print(tiles\_needed,"tiles")

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **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 |  |

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**Ex. No. : 12.2 Date: 05.06.2024**

**Register No.: 231401009 Name: M.ANJALI**

#### Identifying Powers of Three

Given an integer n, print true if it is a power of three. Otherwise, print false. An integer n is a power of three, if there exists an integer x such that n == 3x. **Input Format**

User inputs a number. **Output Format** Print true or false.

###### Sample Input

27

0

###### Sample Output

True False

###### For example:

|  |  |
| --- | --- |
| **Input** | **Result** |
| 27 | True |
| 0 | False |

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**Answer:**

def is\_power\_of\_three(n): if n <= 0:

return False while n % 3 == 0:

n /= 3 return n == 1

n=int(input()) print(is\_power\_of\_three(n))

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Input** | **Expected** | **Got** |  |
|  | 27 | True | True |  |
|  | 0 | False | False |  |
|  | -1 | False | False | |

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**Ex. No. : 11.3 Date: 05.06.2024**

**Register No.: 231401009 Name: M.ANJALI**

#### Shoe Inventory Management System

###### 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.

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###### Output Format:

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

###### Constraints:

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

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

1≤N≤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 |  |  |  |  |  |  |  | 200 |
| 2 3 4 | 5 | 6 | 8 | 7 | 6 | 5 | 18 |  |
| 6 |  |  |  |  |  |  |  |  |
| 6 55 |  |  |  |  |  |  |  |  |
| 6 45 |  |  |  |  |  |  |  |  |
| 6 55 |  |  |  |  |  |  |  |  |
| 4 40 |  |  |  |  |  |  |  |  |
| 18 60 |  |  |  |  |  |  |  |  |
| 10 50 |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  | 50 |
| 5 5 5 | 5 | 5 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |
| 5 10 |  |  |  |  |  |  |  |  |
| 5 10 |  |  |  |  |  |  |  |  |
| 5 10 |  |  |  |  |  |  |  |  |
| 5 10 |  |  |  |  |  |  |  |  |
| 5 10 |  |  |  |  |  |  |  |  |

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**Answer:**

X = int(input())

shoe\_sizes = list(map(int, input().split())) N = int(input())

total\_earnings = 0 for \_ in range(N):

size, price = map(int, input().split()) if size in shoe\_sizes:

total\_earnings += price shoe\_sizes.remove(size)

print(total\_earnings)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Input** | **Expected** | **Got** |  |
|  | 10 | 200 | 200 |  |
| 2 3 4 5 6 8 7 6 5 18 |  |  |
| 6 |  |  |
| 6 55 |  |  |
| 6 45 |  |  |
| 6 55 |  |  |
| 4 40 |  |  |
| 18 60 |  |  |
| 10 50 |  |  |
|  | 5 | 50 | 50 |  |
| 5 5 5 5 5 |  |  |
| 5 |  |  |
| 5 10 |  |  |
| 5 10 |  |  |
| 5 10 |  |  |
| 5 10 |  |  |
| 5 10 |  |  |
|  |  | 135 | 135 |  |
| 4 |  |  |
| 4 4 6 6 |  |  |
| 5 |  |  |
| 4 25 |  |  |
| 4 25 |  |  |

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Input** | **Expected** | **Got** |  |
|  | 6 30 |  |  |  |
| 6 55 |
| 6 55 |

**Ex. No. : 12.4 Date: 05.06.2024**

**Register No.: 231401009 Name: M.ANJALI**

**Background:**

#### Book Genre Categorization

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:

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|  |  |
| --- | --- |
| **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 |

**Answer:**

def categorize\_books(): import sys

input = sys.stdin.read

data = input().strip().split('\n') books\_by\_genre = {}

for line in data: if not line: break

book, genre = map(str.strip, line.split(',', 1)) if genre not in books\_by\_genre:

books\_by\_genre[genre] = [] books\_by\_genre[genre].append(book)

for genre, books in books\_by\_genre.items(): print(f"{genre}: {', '.join(books)}")

categorize\_books()

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Input** | **Expected** | **Got** |  |
|  | Introduction to Programming, Programming | Programming: Introduction to Programming | Programming: Introduction to Programming |  |

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Input** | **Expected** | **Got** |  |
|  | Advanced Calculus, Mathematics | Mathematics: Advanced Calculus | Mathematics: Advanced Calculus |  |
|  | Fictional Reality, Fiction  Another World, Fiction | Fiction: Fictional Reality, Another World | Fiction: Fictional Reality, Another World |  |

**Ex. No. : 12.5 Date: 05.06.2024**

**Register No.: 231401009 Name: M.ANJALI**

#### Counting Unique Activity Pairs with a Specific Difference

###### Background:

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.

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###### 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 ≤ n ≤ 105

-104 ≤ nums[i] ≤ 104

0 ≤ k ≤ 104

###### For example:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input** | | | | | **Result** |
| 5 |  |  |  |  | 1 |
| 1 | 3 | 1 | 5 | 4 |  |
| 0 |  |  |  |  |  |
| 4 |  |  |  |  | 4 |
| 1 | 2 | 2 | 1 |  |  |
| 1 |  |  |  |  |  |

**Answer:**

def find\_unique\_pairs(activities, k): count = 0

for i in range(len(activities)):

for j in range(i+1, len(activities)):

if abs(activities[i] - activities[j]) == k: count += 1

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return count n = int(input())

activities = list(map(int, input().split())) k = int(input())

result = find\_unique\_pairs(activities, k) print(result)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Input** | **Expected** | **Got** |  |
|  | 4 | 3 | 3 |  |
| 1 2 3 4 |  |  |
| 1 |  |  |
|  | 5 | 1 | 1 |  |
| 1 3 1 5 4 |  |  |
| 0 |  |  |
|  | 4 | 4 | 4 |  |
| 1 2 2 1 |  |  |
| 1 |  |  |

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