

**RAJALAKSHMI ENGINEERING COLLEGE**  
**RAJALAKSHMI NAGAR, THANDALAM - 602 105**



**RAJALAKSHMI  
ENGINEERING COLLEGE**

**CS23221  
PYTHON PROGRAMMING LAB**

**Laboratory Observation Note Book**

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Year/Branch / Section: **I YEAR- CSBS -A**  
Register No.: **2116231401043**  
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**Reg. No. : 2116231401043**

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**Year: I Branch: Computer Science & Business Systems Sec: A**

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

## Input/Output-Formatting

Ex. No. : 1.1 Date: 14/03/24

Register No.: 231401043 Name: JEEVITHA.R

### Converting Input Strings

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

*Sample Output:*

10,<class 'int'>

10.9,<class 'float'>

| Input | Result               | For example: |
|-------|----------------------|--------------|
|       |                      |              |
| 10    | 10,<class 'int'>     |              |
| 10.9  | 10.9,<class 'float'> |              |

Program:

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

```
d=float(b)
```

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

```
print("{:0.1f}".format(
```

```
d),type(d),sep=",")
```

## Output:

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

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

Ex. No. : 1.2

Date: 14/03/24

Register No.: 231401043 Name: JEEVITHA.R

## 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.

*Sample Input:*

10000 *Sample*

*Output:*

16000 **For**  
**example:**

| Input | Result |
|-------|--------|
| 10000 | 16000  |

## Program:

```
s=int(input()) da=s*0.4  
ha=s*0.2  
print(int(s+da+ha))
```

## Output:

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

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

## **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.

Sample Input:

8.00

Sample Output:

2.828

**For**

**example:**

| Input | Result |
|-------|--------|
| 14.00 | 3.742  |

## **Program:**

```
import math
a=float(input())
s=math.sqrt(a)
print("{:.3f}".format(s))
```

## **Output:**

|   | <b>Input</b> | <b>Expected</b> | <b>Got</b> |   |
|---|--------------|-----------------|------------|---|
| ✓ | 8.00         | 2.828           | 2.828      | ✓ |
| ✓ | 14.00        | 3.742           | 3.742      | ✓ |
| ✓ | 4.00         | 2.000           | 2.000      | ✓ |
| ✓ | 487          | 22.068          | 22.068     | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

## **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.

**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 |                            |

**Program:**

```
buys=int(input())
repair=int(input())
sells=int(input())
```

```
g=(((sells-(buys+repair))/(buys+repair))*100) print("%.2f".format(g),  
"is the gain percent.")
```

## Output:

|   | <b>Input</b>           | <b>Expected</b>            | <b>Got</b>                 |   |
|---|------------------------|----------------------------|----------------------------|---|
| ✓ | 10000<br>250<br>15000  | 46.34 is the gain percent. | 46.34 is the gain percent. | ✓ |
| ✓ | 45500<br>500<br>60000  | 30.43 is the gain percent. | 30.43 is the gain percent. | ✓ |
| ✓ | 5000<br>0<br>7000      | 40.00 is the gain percent. | 40.00 is the gain percent. | ✓ |
| ✓ | 12500<br>5000<br>18000 | 2.86 is the gain percent.  | 2.86 is the gain percent.  | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

## 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.

Sample Input

10

20

Sample Output

Your total refund will be \$6.00.

**For example:**

| Input    | Result                            |
|----------|-----------------------------------|
|          |                                   |
| 20<br>20 | Your total refund will be \$7.00. |

**Program:**

```
a=int(input()) b=int(input()) c=a*0.1 d=b*0.25
e=c+d print("Your total refund will be
${:.2f}.".format(e))
```

# Output:

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

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

Ex. No. : 1.6  
Register No.: 231401043 Name: JEEVITHA.R

Date: 14/03/24

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
```

**Sample Input:** 450

**Sample Output:** weekdays

10.38 weekend

0.38

**For example:**

| Input | Result                         |
|-------|--------------------------------|
| 450   | weekdays 10.38<br>weekend 0.38 |

**Program:**

```
s=int(input())  
a=(500-s)/130  
print("weekdays  
{:.2f}".format(abs(a)+10))  
print("weekend  
{:.2f}".format(abs(a)))
```

**Output:**

|   | <b>Input</b> | <b>Expected</b>                 | <b>Got</b>                      |   |
|---|--------------|---------------------------------|---------------------------------|---|
| ✓ | 450          | weekdays 10.38<br>weekend 0.38  | weekdays 10.38<br>weekend 0.38  | ✓ |
| ✓ | 500          | weekdays 10.00<br>weekend 0.00  | weekdays 10.00<br>weekend 0.00  | ✓ |
| ✓ | 10000        | weekdays 83.08<br>weekend 73.08 | weekdays 83.08<br>weekend 73.08 | ✓ |
| ✓ | 6789         | weekdays 58.38<br>weekend 48.38 | weekdays 58.38<br>weekend 48.38 | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

## 02- Operators in Python

Ex. No. : 2.1

Date: 21/03/24

Register No.: 231401043 Name: JEEVITHA.R

### 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.

Sample Input

10

20

Sample Output

The total weight of all these widgets and gizmos is 2990 grams. **For example:**

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

**Program:** a=int(input()) b=int(input()) print("The total weight of all these widgets

and gizmos is",((a\*75)+(b\*112)), "grams.")

**Output:**

|   | Input    | Expected  | Got    |
|---|----------|---|--------|
| ✓ | 10<br>20 | The total weight of all these widgets and gizmos is 2990 grams. | The to |

Passed all tests! ✓

Correct

## 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.

Sample Input

10

Sample Output

True

Explanation:

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

## Program:

```
a=int(input()) if(a>0 and a<100  
and a%2==0):  
    print("True") else:  
    print("False")
```

## Output:

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

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

**Ex. No. : 2.3**

**Date: 21/03/24**

**Register No.: 231401043    Name: JEEVITHA.R**

## **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.

**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

## **Program:**

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

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

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

```

d=int(input())
e=int(input())
print(b%a==0,c%a==0,d%a
==0,e%a==0)

```

|   | <b>Input</b>              | <b>Expected</b>       | <b>Got</b>            |   |
|---|---------------------------|-----------------------|-----------------------|---|
| ✓ | 5<br>25<br>23<br>20<br>10 | True False True True  | True False True True  | ✓ |
| ✓ | 4<br>23<br>24<br>21<br>12 | False True False True | False True False True | ✓ |
| ✓ | 8<br>64<br>8<br>16<br>32  | True True True True   | True True True True   | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

**Ex. No. : 2.4**

**Date: 21/03/24**

**Register No.: 231401043 Name: JEEVITHA.R**

## **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.

Sample Input

Sample Output:

2

Explanation:

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

## Program:

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

```
n=bin(a)
```

```
n=n.replace("0b","")
```

```
s=str(n) c=list(s)
```

```
d=0 for i in
```

```
range(len(c)):
```

```
if(int(c[i])==1):
```

```
    d+=1 print(d)
```

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

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

## 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.

Sample Input:

10000

Sample Output:

Balance as of end of Year 1: \$10400.00.

Balance as of end of Year 2: \$10816.00.

Balance as of end of Year 3: \$11248.64

## Program:

```
a=int(input()) b=(a*0.04)+a c=b+(b*0.04) d=c+(c*0.04)
```

```
print("Balance as of end of Year 1:
```

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

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

```
 ${:.2f}.".format(d))
```

|   | <b>Input</b> | <b>Expected</b>  | <b>Got</b>  |
|---|--------------|--|---|
| ✓ | 10000        | Balance as of end of Year 1: \$10400.00.<br>Balance as of end of Year 2: \$10816.00.<br>Balance as of end of Year 3: \$11248.64. | Balance as of end of Year 1: \$<br>Balance as of end of Year 2: \$<br>Balance as of end of Year 3: \$ |
| ✓ | 20000        | Balance as of end of Year 1: \$20800.00.<br>Balance as of end of Year 2: \$21632.00.<br>Balance as of end of Year 3: \$22497.28. | Balance as of end of Year 1: \$<br>Balance as of end of Year 2: \$<br>Balance as of end of Year 3: \$ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

**Ex. No. : 2.6**

**Date: 21/03/24**

**Register No.: 231401043    Name: JEEVITHA.R**

### **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.

**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

**Program:**

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

```
b=int(input()) if(a>=18
```

```
and b>40):
```

```
print("True") else:
```

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

|   | <b>Input</b> | <b>Expected</b> | <b>Got</b> |   |
|---|--------------|-----------------|------------|---|
| ✓ | 19<br>45     | True            | True       | ✓ |
| ✓ | 18<br>40     | False           | False      | ✓ |
| ✓ | 18<br>42     | True            | True       | ✓ |
| ✓ | 16<br>45     | False           | False      | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

**Ex. No. : 2.7**

**Date: 21/03/24**

**Register No.: 231401043    Name: JEEVITHA.R**

## 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 arithmetic operators to solve the problem, not anything else.

Hint:

Use ASCII values of C and D.

**Input Format:**

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

**Output Format:** output a single character "C" or "D"depending on the value of x.

**Input 1:**

0

**Output 1:**

C

**Input 2:**

1

**Output 1: D**

## Program:

```
a=int(input()) if(a==0):
```

```
    print("C") else:
```

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

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

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

## **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.

### **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

### **Program:**

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

```
b=int(input()) if(a%3==0
```

```
and b%2==0):
```

```
print("True") else:
```

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

|   | <b>Input</b>  | <b>Expected</b> | <b>Got</b> |   |
|---|---------------|-----------------|------------|---|
| ✓ | 32<br>43      | False           | False      | ✓ |
| ✓ | 273<br>7890   | True            | True       | ✓ |
| ✓ | 800<br>4590   | False           | False      | ✓ |
| ✓ | 6789<br>32996 | True            | True       | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

**Ex. No. : 2.9**

**Date: 21/03/24**

**Register No.: 231401043    Name: JEEVITHA.R**

## 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.

Sample Input

100

Sample Output

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

## Program:

```
a=int(input())
print("The tax is {:.2f} and the tip is {:.2f}, making the total {:.2f}".format((a*0.05),(a*0.18),(a+((a*0.05)+(a*0.18)))))
```

## Output:

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

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

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

**Date:** 21/03/24

**Register No.:** 231401043    **Name:** JEEVITHA.R

### **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

**For example:**

| <b>Input</b> | <b>Result</b> |
|--------------|---------------|
|              |               |
| 123          | 3             |

**Program:**

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

```
print(abs(a)%10)
```

**Output:**

|   | <b>Input</b> | <b>Expected</b> | <b>Got</b> |   |
|---|--------------|-----------------|------------|---|
| ✓ | 197          | 7               | 7          | ✓ |
| ✓ | -197         | 7               | 7          | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

## 03 - Selection Structures in Python

Ex. No. : 3.1 Date: 28/03/2024

Register No.: 231401043 Name: JEEVITHA.R

### Admission Eligibility

Write a program to find the eligibility of admission for a professional course based on the following criteria: Marks in Maths  $\geq 65$

Marks in Physics  $\geq 55$

Marks in Chemistry  $\geq 50$

Or

Total in all three subjects  $\geq 180$

Sample Test Cases

Test Case 1

Input

70

60

80

Output

The candidate is eligible

Test Case 2

Input

50

80

80

Output

The candidate is eligible

Test Case 3

Input

50

60

40

Output

The candidate is not eligible **For example:**

| <b>Input</b> | <b>Result</b>             |
|--------------|---------------------------|
| 50           | The candidate is eligible |
| 80           |                           |
| 80           |                           |

## Program:

```
a=int(input())      b=int(input())
c=int(input())
if(a>=65 and b>=55
and   c>=50):
    print("The
candidate      is      eligible")
elif(a+b+c>=180):
    print("The candidate is eligible")
else:
    print("The candidate is not
eligible")
```

## Output:

|   | <b>Input</b>   | <b>Expected</b>               | <b>Got</b>                    |   |
|---|----------------|-------------------------------|-------------------------------|---|
| ✓ | 70<br>60<br>80 | The candidate is eligible     | The candidate is eligible     | ✓ |
| ✓ | 50<br>80<br>80 | The candidate is eligible     | The candidate is eligible     | ✓ |
| ✓ | 50<br>60<br>40 | The candidate is not eligible | The candidate is not eligible | ✓ |
| ✓ | 20<br>10<br>25 | The candidate is not eligible | The candidate is not eligible | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

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

**Date:** **28/03/2024**

**Register No.:** **231401043**    **Name:** **JEEVITHA.R**

## **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.

Sample Input 1

60

60

60

Sample Output 1

That's a equilateral triangle

**For example:**

| <b>Input</b>   | <b>Result</b>               |
|----------------|-----------------------------|
| 40<br>40<br>80 | That's a isosceles triangle |

**Program:**

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

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

```
c=int(input()) if(a==b and
```

```
b==c):
```

```

print("That's a equilateral triangle")
elif(a!=b and b==c or a==b and b!=c):
    print("That's a isosceles triangle") elif(a!=b and
b!=c):
    print("That's a scalene triangle")

```

## Output:

|   | <b>Input</b>   | <b>Expected</b>               | <b>Got</b>                    |   |
|---|----------------|-------------------------------|-------------------------------|---|
| ✓ | 60<br>60<br>60 | That's a equilateral triangle | That's a equilateral triangle | ✓ |
| ✓ | 40<br>40<br>80 | That's a isosceles triangle   | That's a isosceles triangle   | ✓ |
| ✓ | 50<br>60<br>70 | That's a scalene triangle     | That's a scalene triangle     | ✓ |
| ✓ | 50<br>50<br>80 | That's a isosceles triangle   | That's a isosceles triangle   | ✓ |
| ✓ | 10<br>10<br>10 | That's a equilateral triangle | That's a equilateral triangle | ✓ |

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

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

**Date:** **28/03/2024**

**Register No.:** **231401043**    **Name:** **JEEVITHA.R**

## **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 | @1.80         |
| 600 and above                   | @2.00         |

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

**Sample Test Cases**

**Test Case 1**

Input

50

Output

100.00

**Test Case 2**

Input

300

Output

517.50

**For example:**

| Input | Result  |
|-------|---------|
|       |         |
| 500   | 1035.00 |

**Program:**

```

a=float(input()) b=0

if(a<=199):

b=a*1.2 elif(200<=a<400):

b=a*1.5 elif(400<=a<600):

b=a*1.8 elif(a>600):

b=a*2.0 if (int(b)<100):

print("{:.2f}".format(100)) else:

if(b>400.00):

print("{:.2f}".format((b+(b*0.15)))) else:

print("{:.2f}".format(b))

```

## Output:

|   | <b>Input</b> | <b>Expected</b> | <b>Got</b> |   |
|---|--------------|-----------------|------------|---|
| ✓ | 50           | 100.00          | 100.00     | ✓ |
| ✓ | 100.00       | 120.00          | 120.00     | ✓ |
| ✓ | 500          | 1035.00         | 1035.00    | ✓ |
| ✓ | 700          | 1610.00         | 1610.00    | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

**Ex. No. : 3.4 Date: 28/03/2024**

**Register No.: 231401043 Name: JEEVITHA.R**

## **IN/OUT**

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

**Input Format:**

Input consists of 2 integers.

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

**Output Format:**

Output consists of the string “IN” or “OUT”.

**Sample Input and Output:**

**Input**

8

3

**Output**

OUT

For example:

| Input | Result |
|-------|--------|
| 8     | OUT    |
| 3     |        |

Program:

```
a=int(input())  
  
b=int(input()) c=(a/2)  
  
if(c>b):  
  
    print("OUT")  
  
else:    print("IN")
```

Output:

|   | Input    | Expected | Got |   |
|---|----------|----------|-----|---|
| ✓ | 8<br>3   | OUT      | OUT | ✓ |
| ✓ | 8<br>5   | IN       | IN  | ✓ |
| ✓ | 20<br>9  | OUT      | OUT | ✓ |
| ✓ | 50<br>31 | IN       | IN  | ✓ |

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

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

**Date:** **28/03/2024**

**Register No.:** **231401043**    **Name:** **JEEVITHA.R**

## **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. 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:**

| <b>Input</b> | <b>Result</b>   |
|--------------|---|
| y            | Sometimes it's a vowel... Sometimes it's a consonant. |
| u            | It's a vowel.   |

p

It's a consonant.

## Program:

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

## Output:

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

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

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

**Date:** **28/03/2024**

**Register No.:** **231401043**    **Name:** **JEEVITHA.R**

## **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.

Sample Input 1

1900

Sample Output 1

1900 is not a leap year.

Sample Input 2

2000

Sample Output 2

2000 is a leap year.

## **Program:**

```
year=int(input()) if(year%400==0):
```

```
    print(year,"is a leap year.") else:
```

```
    print(year,"is not a leap year.")
```

## **Output:**

|   | <b>Input</b> | <b>Expected</b>          | <b>Got</b>               |   |
|---|--------------|--------------------------|--------------------------|---|
| ✓ | 1900         | 1900 is not a leap year. | 1900 is not a leap year. | ✓ |
| ✓ | 2000         | 2000 is a leap year.     | 2000 is a leap year.     | ✓ |
| ✓ | 2100         | 2100 is not a leap year. | 2100 is not a leap year. | ✓ |
| ✓ | 2400         | 2400 is a leap year.     | 2400 is a leap year.     | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

**Ex. No. : 3.7 Date: 28/03/2024**

**Register No.: 231401043 Name: JEEVITHA.R**

## **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 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.          |

**Program:**

```
m=input() if(m=="January"):  
    print(m,"has 31 days in it.")  
  
elif(m=="February"):  
    print(m,"has 28 or 29 days in it.")  
  
elif(m=="March"):    print(m,"has 31  
days in it.") elif(m=="April"):  
    print(m,"has 30 days in it.")
```

```

elif(m=="May"):    print(m,"has 31
days in it.") elif(m=="June"):

print(m,"has 30 days in it.")

elif(m=="July"):

print(m,"has 31 days in it.")

elif(m=="August"):

print(m,"has 31 days in it.")

elif(m=="September"):

print(m,"has 30 days in it.")

elif(m=="October"):

print(m,"has 31 days in it.")

elif(m=="November"):

print(m,"has 30 days in it.")

elif(m=="December"):

print(m,"has 31 days in it.")

```

## Output:

|   | <b>Input</b> | <b>Expected</b>                   | <b>Got</b>                        |
|---|--------------|-----------------------------------|-----------------------------------|
| ✓ | February     | February has 28 or 29 days in it. | February has 28 or 29 days in it. |
| ✓ | March        | March has 31 days in it.          | March has 31 days in it.          |
| ✓ | April        | April has 30 days in it.          | April has 30 days in it.          |
| ✓ | May          | May has 31 days in it.            | May has 31 days in it.            |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

**Ex. No.** : **3.8**                   **Date:** **28/03/2024**

**Register No.:** **231401043**   **Name:** **JEEVITHA.R**

### **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  $3^2 + 4^2 = 25 = 5^2$ . You are given three integers, a, b, and c. They need not be given in increasing order. If they form a Pythagorean triple, then print "Yes", otherwise, print "No".

#### **Sample Input**

3

5

4

#### **Sample Output**

Yes

**For example:**

| Input | Result |
|-------|--------|
|       | Yes    |
| 3     |        |
| 4     |        |
| 5     |        |

**Program:**

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

c=int(input())

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

elif(c*c+b*b==a*a):
    print("yes") else:
    print("no")
```

**Output:**

|   | Input       | Expected | Got |   |
|---|-------------|----------|-----|---|
| ✓ | 3<br>5<br>4 | yes      | yes | ✓ |
| ✓ | 5<br>8<br>2 | no       | no  | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

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

**Date:** **28/03/2024**

**Register No.:** **231401043**    **Name:** **JEEVITHA.R**

## **Second last digit**

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

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

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

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

| <b>Input</b> | <b>Result</b> |
|--------------|---------------|
| 197          | 9             |

## **Program:**

```
a=int(input())
b=str(abs(a)) l=len(b)
if(l>1):
    print(int(b[-2])) else:
    print(-1)
```

## Output:

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

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

Ex. No. : 3.10 Date: 28/03/2024

Register No.: 231401043 Name: JEEVITHA.R

## 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.

Sample Input 1

2010

Sample Output 1

2010 is the year of the Tiger.

Sample Input 2

2020

Sample Output 2

2020 is the year of the Rat.

## Program:

```
a=int(input()) b=a%100  
  
c=b%12 if(c==0):  
  
    print(a,"is the year of the Dragon.")  
  
elif(c==1):  
  
    print(a,"is the year of the Snake.")  
  
elif(c==2):  
  
    print(a,"is the year of the Horse.")  
  
elif(c==3):
```

```

print(a,"is the year of the Sheep.")

elif(c==4):

    print(a,"is the year of the Monkey.")

elif(c==5):

    print(a,"is the year of the Rooster.")

elif(c==6):

    print(a,"is the year of the Dog.")

elif(c==7):

    print(a,"is the year of the Pig.") elif(c==8):

        print(a,"is the year of the Rat.")

elif(c==9):

    print(a,"is the year of the Ox.")

elif(c==10):

    print(a,"is the year of the Tiger.")
elif(c==11):

    print(a,"is the year of the Hare.")

```

## Output:

|   | <b>Input</b> | <b>Expected</b>                | <b>Got</b>                     |   |
|---|--------------|--------------------------------|--------------------------------|---|
| ✓ | 2010         | 2010 is the year of the Tiger. | 2010 is the year of the Tiger. | ✓ |
| ✓ | 2020         | 2020 is the year of the Rat.   | 2020 is the year of the Rat.   | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.



# 05 - List in Python

Ex. No. : 5.1

Date: 18.04.2024

Register No.: 231401043 Name: JEEVITHA.R

## 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

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

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

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

Sample Case 0

Sample Input 0

```
4  
1      2  
3  
3
```

Sample Output 0

2

Explanation 0

The sum of the first two elements,  $1+2=3$ . The value of the last element is 3

Using zero based indexing, arr[2]=3 is the pivot between the two subarrays

The index of the pivot is 2

Sample Case

1

Sample Input

1

1 2 1

1

Sample Output

1

Explanation

1

The first and last elements are equal to Using zero based indexing, arr[1]=2 is the pivot between the two subarrays The index of the pivot is 1. **Error! Bookmark not defined.** 3

1

**For example:**

| Input                 | Result |
|-----------------------|--------|
| 4<br>1<br>2<br>3<br>3 | 2      |
| 3<br>1<br>2<br>1      | 1      |

**Program:**

```
a=int(input())  
  
l=[] for i in  
  
range(a):  
  
    c=int(input())  
  
    l.append(c) for i  
  
in range(1,a):  
  
    d=sum(l[0:i])  
  
    r=sum(l[i+1:])  
  
    if(d==r):  
  
        print(i)
```

**Output:**

|   | <b>Input</b>          | <b>Expected</b> | <b>Got</b> |   |
|---|-----------------------|-----------------|------------|---|
| ✓ | 4<br>1<br>2<br>3<br>3 | 2               | 2          | ✓ |
| ✓ | 3<br>1<br>2<br>1      | 1               | 1          | ✓ |

Passed all tests! ✓

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

**Date:** 18.04.2024

**Register No.:** 231401043    **Name:** JEEVITHA.R

### **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  $A[i] - A[j] = k$ ,  $i \neq j$ .

**Input Format**

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

**Output format**

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

Input

1

3

1

3

5

4

Output:

1

Input

1

3

1

3

5

99

Output

0

**For example:**

**Input**

**Result**

|                             |               |
|-----------------------------|---------------|
| 1<br>3<br>1<br>3<br>5<br>4  | 1             |
| <b>Input</b>                | <b>Result</b> |
| 1<br>3<br>1<br>3<br>5<br>99 | 0             |

## Program:

```
a=int(input()) while(a!=0):
b=int(input()) l=[] f=0
for i in range(b):
c=int(input())
l.append(c)
k=int(input()) a-=1 for
i in range(b): for j in
range(b): if(l[i]-
l[j]==k and i!=j):
f=1 break
if(f==1): print(1)
else:
print(0)
```

## Output:

|   | Input                       | Expected | Got |   |
|---|-----------------------------|----------|-----|---|
| ✓ | 1<br>3<br>1<br>3<br>5<br>4  | 1        | 1   | ✓ |
| ✓ | 1<br>3<br>1<br>3<br>5<br>99 | 0        | 0   | ✓ |

Passed all tests! ✓

Ex. No. : 5.3

Date: 18.04.2024

Register No.: 231401043 Name: JEEVITHA.R

### Count Elements

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

Sample Test Cases

Test Case 1

Input

7

23

45

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

## Program:

```
import collections def CountFrequency(arr):
    return collections.Counter(arr)

if __name__ == "__main__":
    # Input size of array
    n = int(input())

    # Input elements in array
    arr = []      for _ in
range(n):
    ele = int(input())
    arr.append(ele)
```

```
# Calculate frequency of each element  
freq = CountFrequency(arr)
```

```
for key, value in freq.items():  
    print(f'{key} occurs {value} times')
```

## Output:

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

Passed all tests! ✓

**Ex. No. : 5.4 Date: 18.04.2024**

**Register No.: 231401043 Name: JEEVITHA.R**

### **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

**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
```

## Program:

```
def merge_arrays_without_duplicates(arr1, arr2):
    # Combine the arrays and convert to a set to remove duplicates
    result_set = set(arr1 + arr2)    # Convert the set back to a sorted list
    merged_sorted_array = sorted(result_set)    return
merged_sorted_array # Input read and processing def
process_input():

    # Reading number of elements and the elements for the first array
    n1 = int(input())    array1 = []    for _ in range(n1):
        element = int(input())
        array1.append(element)

    # Reading number of elements and the elements for the second
    array    n2 = int(input())    array2 = []    for _ in range(n2):
        element = int(input())    array2.append(element)
    # Merge the arrays without
    duplicates    result =
    merge_arrays_without_duplicates(array1, array2)
```

```
# Print the result    print("
".join(map(str, result)))
```

## Output:

|   | <b>Input</b>  | <b>Expected</b>               |
|---|---|-------------------------------|
| ✓ | 5<br>1<br>2<br>3<br>6<br>9<br>4<br>2<br>4<br>5<br>10  | 1 2 3 4 5 6 9 10              |
| ✓ | 7<br>4<br>7<br>8<br>10<br>12<br>30<br>35<br>9<br>1<br>3<br>4<br>5<br>7<br>8<br>11<br>13<br>22 | 1 3 4 5 7 8 10 11 12 13 22 30 |

Passed all tests! ✓

Ex. No. : 5.5 Date:18.04.2024

Register No.: 231401043 Name: JEEVITHA.R

## 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.

|                                 |                           |
|---------------------------------|---------------------------|
| Sample Test Cases               | 22                        |
| Test Case 1                     | 33                        |
| Input                           | 55                        |
| 1        66  3    77            |                           |
| 4                               | 88                        |
| 5                               | 99                        |
| 6                               | 110                       |
| 7                               | 120                       |
| 8                               | 44                        |
| 9                               |                           |
| 10                              | Output                    |
| 11                              |                           |
| 2        ITEM to be inserted:44 | After insertion array is: |
| Output                          | 11                        |
| ITEM to be inserted:2           | 22                        |
| After insertion array is:       | 33                        |
| 1                               | 44                        |
| 2                               | 55                        |
| 3                               | 66                        |
| 4                               | 77                        |
| 5                               | 88                        |
| 6                               | 99                        |
| 7                               | 110                       |
| 8                               | 120                       |
| 9                               |                           |
| 10                              |                           |
| 11                              |                           |

Test Case 2

Input  
11

## Program: Output:

```

def insert_sorted(list, n):    list.append(n)
sorted_list = sorted(list)    print("After
insertion array is:")    for i in range(11):
                           print(sorted_list[i])

sorted_list = [int(input()) for i in range(10)]
new_element = int(input())
print("ITEM to be inserted:", new_element,
sep="") insert_sorted(sorted_list,
new_element)

```

|   | Input  | Expected  | Given  |
|---|--|---|--|
| ✓ | 1<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>2            | ITEM to be inserted:2<br>After insertion array is:<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11             | I1<br>Af<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11            |
| ✓ | 11<br>22<br>33<br>55<br>66<br>77<br>88<br>99<br>110<br>120<br>44 | ITEM to be inserted:44<br>After insertion array is:<br>11<br>22<br>33<br>44<br>55<br>66<br>77<br>88<br>99<br>110<br>120 | I1<br>Af<br>11<br>22<br>33<br>44<br>55<br>66<br>77<br>88<br>99<br>110<br>120 |

Passed all tests! ✓



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

**Date:** 18.04.2024

**Register No.:** 231401043    **Name:** JEEVITHA.R

## **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  $p^{\text{th}}$  element of the [list](#), sorted ascending. If there is no  $p^{\text{th}}$  element, return 0. **Constraints**

$$1 \leq n \leq 10^{15}$$

$$1 \leq p \leq 10^9$$

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.

### **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  $p = 3^{\text{rd}}$  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  $p = 1^{\text{st}}$  factor of 1 is returned as the answer.

**For example:**

| Input   | Result |
|---------|--------|
| 10<br>3 | 5      |
| 10<br>5 | 0      |
| 1<br>1  | 1      |

## Program:

```
import sys import math
```

```
def find_factors(n):      factors = []
    for i in range(1, int(math.sqrt(n)) +
1):      if n % i == 0:      factors.append(i)
    if i != n // i:
        factors.append(n // i)
return sorted(factors)
```

```
def get_pth_factor(n, p):
factors = find_factors(n)  if p
<= len(factors):      return
factors[p - 1]
else:
```

```
    return 0
```

```
# Reading input directly from the standard input (typically for competitive  
programming) input = sys.stdin.read data = input().split() n = int(data[0]) p  
= int(data[1])
```

```
# Calculate and print the p-th factor print(get_pth_factor(n, p))
```

## Output:

|   | Input   | Expected | Got |   |
|---|---------|----------|-----|---|
| ✓ | 10<br>3 | 5        | 5   | ✓ |
| ✓ | 10<br>5 | 0        | 0   | ✓ |
| ✓ | 1<br>1  | 1        | 1   | ✓ |

Passed all tests! ✓

**Ex. No. : 5.7 Date: 18.04.2024**

**Register No.: 231401043 Name: JEEVITHA.R**

## 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

Sample test case

Sample input

```
2  
2  
1  
3  
5  
7  
2  
4  
6  
8
```

Sample Output

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

## Program:

```
def zip_lists(list1, list2):  
    return [row1 + row2 for row1, row2 in zip(list1, list2)]
```

```
def main():
```

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

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

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

```
    = zip_lists(list1, list2)
```

```
    print(zipped_list)
```

```
if __name__ == "__main__":
    main()
```

## Output:

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

Passed all tests! ✓

Ex. No.

: 5.8

Date: 18.04.2024

Register No.: 231401043 Name: JEEVITHA.R

## 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

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
```

## Program:

```
def merge_arrays_without_duplicates(arr1, arr2):  
    # Combine the arrays and convert to a set to remove duplicates  
    result_set = set(arr1 + arr2)    # Convert the set back to a sorted list  
    merged_sorted_array = sorted(result_set)    return  
merged_sorted_array  
  
# Input read and processing def  
process_input():  
    # Reading number of elements and the elements for the first array    n1  
    = int(input())    array1 = []    for _ in range(n1):  
        element = int(input())  
        array1.append(element)  
  
    # Reading number of elements and the elements for the second array    n2  
    = int(input())    array2 = []    for _ in range(n2):  
        element = int(input())  
        array2.append(element)
```

```
# Merge the arrays without duplicates    result =  
merge_arrays_without_duplicates(array1, array2)  
  
# Print the result    print("".join(map(str, result)))
```

**Output:**

|   | <b>Input</b>  | <b>Expected</b>               |
|---|---|-------------------------------|
| ✓ | 5<br>1<br>2<br>3<br>6<br>9<br>4<br>2<br>4<br>5<br>10  | 1 2 3 4 5 6 9 10              |
| ✓ | 7<br>4<br>7<br>8<br>10<br>12<br>30<br>35<br>9<br>1<br>3<br>4<br>5<br>7<br>8<br>11<br>13<br>22 | 1 3 4 5 7 8 10 11 12 13 22 30 |

Passed all tests! ✓

**Ex. No.** : **5.9**                      **Date:**18.04.2024

**Register No.:** 231401043    **Name:** JEEVITHA.R

## **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.

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

5  
6  
5  
7

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

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

Sample Test Cases

Test Case 1

Input

4  
5  
6  
5  
7  
5

Output

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

Test Case 2

Input

5  
67  
80  
45  
97  
100  
50

**Output**

50 is not present in the array.

## Program:

```
def find_element_locations(lst, target):  
    locations = []    count = 0  
    for i in range(len(lst)):  
        if lst[i] == target:  
            locations.append(i + 1)  
            count += 1  
  
    return locations, count  
  
def main():  
    n = int(input())    lst = [int(input())  
        for _ in range(n)]    target = int(input())  
  
    locations, count = find_element_locations(lst, target)  
  
    if count == 0:  
        print(f'{target} is not present in the array.')  
    else:  
        for loc in locations:  
            print(f'{target} is present at location {loc}.')  
        print(f'{target} is present {count} times in the array.')
```

```
if __name__ == "__main__":
    main()
```

## Output:

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

Passed all tests! ✓

Ex. No. : 5.10 Date: 18.04.2024

Register No.: 231401043 Name: JEEVITHA.R

## 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"

Sample Test Case

Input

7

1

2

3

0

4

5

6

Output

True

## Program:

```
n= int(input()) arr = [int(input())  
for i in range(n)] l = arr.copy()  
g=0 size = len(arr) arr_asc =  
sorted(arr) arr_des =  
sorted(arr)[::-1] if arr==arr_asc  
or arr==arr_des: print('True')  
g=1 else: for i in arr:
```

```

l.remove(i)      arr_asc.remove(i)

arr_des.remove(i)    if l==arr_asc or

l==arr_des:

    print('True')      g=1

break      l=arr.copy()

arr_asc = sorted(arr)      arr_des

= sorted(arr)[::-1] if g==0:

print('False')

```

## Output:

|   | <b>Input</b>                         | <b>Expected</b> | <b>Got</b> |   |
|---|--------------------------------------|-----------------|------------|---|
| ✓ | 7<br>1<br>2<br>3<br>0<br>4<br>5<br>6 | True            | True       | ✓ |
| ✓ | 4<br>2<br>1<br>0<br>-1               | True            | True       | ✓ |

Passed all tests! ✓

# **06 - Strings in Python**

**Ex. No. : 6.1 Date:04.05.2024**

**Register No.: 231401043 Name: JEEVITHA.R**

## **Count Chars**

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

For example:

| Input   | Result |
|---------|--------|
| rec@123 | 3      |
|         | 3      |
|         | 1      |

## **Program:**

```
a=input() c,d,s=0,0,0 for
i in range(len(a)):
if(a[i].isalpha()):
    c+=1    elif(a[i].isdigit()):
        d+=1
else:    s+=1
print(c,d,s,sep="\n")
```

## Output:

|   | Input           | Expected    | Got         |   |
|---|-----------------|-------------|-------------|---|
| ✓ | rec@123         | 3<br>3<br>1 | 3<br>3<br>1 | ✓ |
| ✓ | P@#yn26at^&i5ve | 8<br>3<br>4 | 8<br>3<br>4 | ✓ |
| ✓ | abc@12&         | 3<br>2<br>2 | 3<br>2<br>2 | ✓ |

Passed all tests! ✓

Ex. No. : 6.2

Date:04.05.2024

Register No.: 231401043 Name: JEEVITHA.R

### Decompress the String

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

Sample Input 1 a2b4c6

Sample Output 1  
aabbbbcccccc

### Program:

```
import re a=input()
all=re.findall('\d+',a) all_w=re.findall('[a-z]',a)
b="" for i,j in zip(all,all_w):
    b+=int(i)*j print(b)
```

### Output:

|   | Input   | Expected            | Got                 |   |
|---|---------|---------------------|---------------------|---|
| ✓ | a2b4c6  | aabbbbcccccc        | aabbbbcccccc        | ✓ |
| ✓ | a12b3d4 | aaaaaaaaaaaabbddddd | aaaaaaaaaaaabbddddd | ✓ |

Passed all tests! ✓

Ex. No. : 6.3

Date:04.05.2024

Register No.: 231401043 Name: JEEVITHA.R

### 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.

**Input Format:**

The first line contains S1.  
The second line contains S2.  
The third line contains N.

**Output Format:**

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

**Boundary Conditions:**

$2 \leq N \leq 10$   
 $2 \leq \text{Length of } S1, S2 \leq 1000$

**Example Input/Output 1:**

**Input:**

abcbde cdefghbb  
3

**Output:**

bcd

**Note:**

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

**Program:**

```
a=input() b=input()
C="" d=int(input())
for i in range(len(a)):
    if(len(C)-d==0):
        break
    else:
        if(a[i] in b):
            if(a[i] not in C):
                C+=a[i]
print(C)
```

**Output:**

|   | <b>Input</b>            | <b>Expected</b> | <b>Got</b> |   |
|---|-------------------------|-----------------|------------|---|
| ✓ | abcbde<br>cdefghbb<br>3 | bcd             | bcd        | ✓ |

Passed all tests! ✓

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

**Date:04.05.2024**

**Register No.: 231401043 Name: JEEVITHA.R**

## **Remove Characters**

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

Constraints

1<= string length <= 200 Sample

Input 1 experience enc

Sample Output 1 xpri

## **Program:**

```
def remove_chars(s1, s2):
    return ''.join([char for char in s1 if char not in
    s2]) s1=input() s2=input() result = remove_chars(s1,
    s2) print(result)
```

## **Output:**

|   | <b>Input</b>      | <b>Expected</b> | <b>Got</b> |   |
|---|-------------------|-----------------|------------|---|
| ✓ | experience<br>enc | xpri            | xpri       | ✓ |

Passed all tests! ✓

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

**Date:04.05.2024**

**Register No.: 231401043 Name: JEEVITHA.R**

## **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

For example:

| Input                         | Expected            |
|-------------------------------|---------------------|
| Malayalam is my mother tongue | is my mother tongue |
| He did a good deed            | he good             |

## Program:

```
a=[] a=input()
b=a. split() for
i in b:
    k=i.lower()
if k!=k[::-1]:
    print(k,end=' ')
```

## Output:

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

Passed all tests! ✓

Ex. No. : 6.6

Date:04.05.2024

Register No.: 231401043 Name: JEEVITHA.R

## Return Second Word 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.

For example:

Input Result

Wipro Technologies Bangalore

TECHNOLOGIES

Hello World

WORLD

Hello

LESS

## Program:

```
f=input()
s=f.split() if
len(s)>1:   c=s[1]
print(c.upper()) else:
    print("LESS")
```

## Output:

|   | <b>Input</b>                 | <b>Expected</b> | <b>Got</b>   |   |
|---|------------------------------|-----------------|--------------|---|
| ✓ | Wipro Technologies Bangalore | TECHNOLOGIES    | TECHNOLOGIES | ✓ |
| ✓ | Hello World                  | WORLD           | WORLD        | ✓ |
| ✓ | Hello                        | LESS            | LESS         | ✓ |

Passed all tests! ✓

**Ex. No. : 6.7**

**Date:04.05.2024**

**Register No.: 231401043 Name: JEEVITHA.R**

## **Reverse 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.

Input:

A&B

Output:

B&A

Explanation: As we ignore '&' and

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

For example:

Input Result

A&x# x&A#

## **Program:**

```
def reverse_string(s):
    s = list(s)
    l, r = 0, len(s) - 1

    while l < r:
        if not
            s[l].isalpha():
                l
                += 1
            elif not
                s[r].isalpha():
                    r -= 1
        else:
            s[l], s[r] = s[r], s[l]
        l += 1
        r -= 1

    return ''.join(s)
```

```
# Test Cases print(reverse_string(input())) #
```

Output: "B&A"

## Output:

|   | Input | Expected | Got |   |
|---|-------|----------|-----|---|
| ✓ | A&B   | B&A      | B&A | ✓ |

Passed all tests! ✓

**Ex. No. : 6.8**

**Date:04.05.2024**

**Register No.: 231401043 Name: JEEVITHA.R**

## **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".

For example:

Input Result

Yn

PYnative

True

## **Program:**

```
a=input() b=input()  
if a in b:  
    print("True") else:  
        print("False")
```

## **Output:**

|   | <b>Input</b>    | <b>Expected</b> | <b>Got</b> |   |
|---|-----------------|-----------------|------------|---|
| ✓ | Yn<br>PYnative  | True            | True       | ✓ |
| ✓ | Ynf<br>PYnative | False           | False      | ✓ |

Passed all tests! ✓

**Ex. No. : 6.9**

**Date:04.05.2024**

**Register No.: 231401043 Name: JEEVITHA.R**

## 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: **Input:**

```
first  
second first  
third  
second
```

then your program should display:

**Output:**

```
first  
second  
third
```

## Program:

```
a,c=[],[] for i in  
range(0,5):  
b=input()  
    a.append(b) for i in  
    range(len(a)):  
        if(a[i] not in c):  
            c.append(a[i])  
            print(a[i])
```

## Output:

|   | <b>Input</b>                                | <b>Expected</b>          | <b>Got</b>               |   |
|---|---|--------------------------|--------------------------|---|
| ✓ | first<br>second<br>first<br>third<br>second | first<br>second<br>third | first<br>second<br>third | ✓ |
| ✓ | rec<br>cse<br>it<br>rec<br>cse              | rec<br>cse<br>it         | rec<br>cse<br>it         | ✓ |

Passed all tests! ✓

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

**Date:04.05.2024**

**Register No.: 231401043 Name: JEEVITHA.R**

## **Username Domain Extension**

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

### **Input Format:**

The first line contains S.

### **Output Format:**

The first line contains EXTENSION.

The second line contains DOMAIN.

The third line contains USERNAME.

### **Boundary Condition:**

1 <= Length of S <= 100

Example Input/Output 1:

### **Input:**

vijayakumar.r@rajalakshmi.edu.in

### **Output:**

edu.in rajalakshmi

vijayakumar.r

## **Program:**

```
a = input() ext = a.split('@')[0]
dom = a.split('@')[1].split('.')[0]
userno = a.find('.')
user =
a[userno+1:] print(user) print(dom,
end='\\n') print(ext,end='\\n')
```

## Output:

|   | <b>Input</b>   | <b>Expected</b>      | <b>Got</b>           |   |
|---|----------------|----------------------|----------------------|---|
| ✓ | abcd@gmail.com | com<br>gmail<br>abcd | com<br>gmail<br>abcd | ✓ |

Passed all tests! ✓

# 07 - Functions

Ex. No. : 7.1

Date: 27/5/24

Register No.: 231401043 Name: JEEVITHA.R

## Abundant Number

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

### **Input Format:**

Take input an integer from stdin

### **Output**

### **Format:**

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

### **Example**

### **input:**

12

### **Output:**

Yes

### **Explanation**

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

### **Example input:**

13

### **Output:**

No

### **Explanation**

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

For example:

| Test                | Result |
|---------------------|--------|
| print(abundant(12)) | Yes    |
| print(abundant(13)) | No     |

## **Program:**

```
def abundant(n):
```

```
l,s=[],0    for i in
```

```
range(1,int(n//2)+1):
```

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

```
    l.append(i)
```

```
for i in l:      s+=i
```

```
if(s>n):
```

```
    return("Yes")
```

```
else:
```

```
    return("No")
```

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

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

Output:

**Ex. No. :**

**Date:**

**Register No.:**

**Name:**

**Ex. No : 7.2**

**Date:27/5/24**

**Register No.: 231401043 Name: JEEVITHA.R**

## **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 For example:

Test                      Result

print(automorphic(5))      Automorphic

## **Program:**

```
def automorphic(n):
    a=str(n*n)
    if(int(a[1])==n):
        return("Automorphic")
    else:
        return("Not Automorphic")
```

## Output:

|   | Test                  | Expected        | Got             |   |
|---|-----------------------|-----------------|-----------------|---|
| ✓ | print(automorphic(5)) | Automorphic     | Automorphic     | ✓ |
| ✓ | print(automorphic(7)) | Not Automorphic | Not Automorphic | ✓ |

Passed all tests! ✓

**Correct**  
Marks for this submission: 1.00/1.00.

**Ex. No : 7.3**

**Date:27/5/24**

**Register No.: 231401043    Name: JEEVITHA.R**

## Check Product of Digits

Write a code to check whether product of digits at even places is divisible by sum of digits at odd place of a positive integer.

Input Format:

Take an input integer from stdin.

Output Format:

Print TRUE or FALSE.

Example Input:

1256

Output:

TRUE

Example Input:

**Ex. No. :**

**Date:**

**Register No.:**

**Name:**

1595

**Output:**

FALSE

For example:

| <b>Test</b>                | <b>Result</b> |
|----------------------------|---------------|
| print(productDigits(1256)) | True          |
| print(productDigits(1595)) | False         |

## **Program:**

```
def productDigits(n):
    a=str(n)    s,p=0,1    for i
    in range(0,len(a),2):
        s+=int(a[i])    for i in
        range(1,len(a),2):
            p*=int(a[i])    if(p%s==0):
                return("True")    else:
                    return("False")
```

**Output:**

|   | Test                       | Expected | Got   |   |
|---|----------------------------|----------|-------|---|
| ✓ | print(productDigits(1256)) | True     | True  | ✓ |
| ✓ | print(productDigits(1595)) | False    | False | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

**Ex. No.** : 7.4

**Date:** 27/5/24

**Register No.:** 231401043    **Name:** JEEVITHA.R

## 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 python code to find the discount value for the given total bill amount.

### **Constraints**

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

### **Input**

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

### **Output**

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

### **Example Input**

578

### **Output**

12

### **For example:**

**Ex. No.** :

**Date:**

**Register No.:**

**Name:**

| <b>Test</b>                   | <b>Result</b> |
|-------------------------------|---------------|
| print(christmasDiscount(578)) | 12            |

## Program:

```
def christmasDiscount(n):
    res=0
    while n!=0:
        rem=n%10
        flag=0      for i in
range(1,rem+1):          if
rem%i==0:
            flag+=1
        if flag==2:
            res=res+rem
        n=n//10
    return res
```

## Output:

|   | <b>Test</b>                   | <b>Expected</b> | <b>Got</b> |   |
|---|-------------------------------|-----------------|------------|---|
| ✓ | print(christmasDiscount(578)) | 12              | 12         | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

**Ex.No:** 7.5

**Date:** 27/5/24

**Register No.:** 231401043    **Name:** JEEVITHA.R

## **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

## **Program:**

```
def coinChange(amount): #
```

**Available coin denominations**

```
coins = [1, 2, 3, 4]
```

```
# Initialize a list to store the minimum number of coins for each amount
from 0 to the target amount  dp = [float('inf')] * (amount + 1)
dp[0] = 0 # Base case: 0 coins needed to make amount 0
```

**Ex. No. :**

**Date:**

**Register No.:**

**Name:**

```
# Iterate through all amounts from 1 to the target amount    for
i in range(1, amount + 1):
    # Iterate through all available coin denominations
    for coin in coins:
        # If the current coin denomination is less than or equal to the current
        # amount
        if coin <= i:
            # Update dp[i] to be the minimum between its current value
            # and dp[i - coin] + 1
            dp[i] = min(dp[i], dp[i - coin] + 1)

    # The result is stored at dp[amount]
return dp[amount]

amount =
int(input())
print(coinChange(amount))
```

**Output:**

|   | Test                  | Expected | Got |
|---|-----------------------|----------|-----|
| ✓ | print(coinChange(16)) | 4        | 4   |

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

**Ex. No. : 7.6**

**Date:27/5/24**

**Register No.: 231401043 Name: JEEVITHA.R**

## **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):
```

```
    a=[] b=[] k=str(n)
```

```
    for i in range(len(k)):      if
```

```
        int(i)%2==0:
```

```
            a.append(int(k[i]))
```

```
    else:
```

```
        b.append(int(k[i]))
```

```
s=sum(b)
```

```
r=sum(a)    j=s-r
```

```
return j
```

## Output:

|   | Test                       | Expected | Got |   |
|---|----------------------------|----------|-----|---|
| ✓ | print(differenceSum(1453)) | 1        | 1   | ✓ |

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

**Ex. No.** : 7.7

**Date:**27/5/24

**Register No.:** 231401043    **Name:** JEEVITHA.R

## **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. **For example:**

| <b>Test</b>          | <b>Result</b> |
|----------------------|---------------|
| print(checkUgly(6))  | ugly          |
| print(checkUgly(21)) | not ugly      |

## **Program:**

```
def checkUgly(n):      for i in
range(n):            for j in range(n):
for k in range(n):
if(n==(2**i)+(3**j)+(5**k)):
return("ugly")
return("not ugly")
```

## Output:

|   | <b>Test</b>          | <b>Expected</b> | <b>Got</b> |   |
|---|----------------------|-----------------|------------|---|
| ✓ | print(checkUgly(6))  | ugly            | ugly       | ✓ |
| ✓ | print(checkUgly(21)) | not ugly        | not ugly   | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

## 08 – Tuple/Set

**Ex. No.** : 8.1                   **Date:**30/5/24

**Register No.:** 231401043   **Name:** JEEVITHA.R

### 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     |

**Program:**

```
a = input() try:    c
```

```
= int(a)
```

```
print("Yes") except:
```

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

## Output:

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

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

**Ex. No. :**

**Date:**

**Register No.:**

**Name:**

**Ex. No: 8.2**

**Date:30/5/24**

**Register No.: 231401043 Name: JEEVITHA.R**

## **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 | 1      |
| 3         |        |
| 1,2       | 0      |
| 0         |        |

## **Program:**

```
t = input() k =  
int(input()) a =  
t.split(",") l = [int(x)  
for x in a] count = 0
```

```

x = set() for i in
range(len(l)):
    for j in range(i + 1, len(l)): if l[i] +
l[j] == k: s = (l[i], l[j]) if s not
in x and (l[j], l[i]) not in x:
    count += 1
x.add(s)
print(count)

```

## Output:

|   | <b>Input</b>      | <b>Expected</b> | <b>Got</b> |   |
|---|-------------------|-----------------|------------|---|
| ✓ | 5,6,5,7,7,8<br>13 | 2               | 2          | ✓ |
| ✓ | 1,2,1,2,5<br>3    | 1               | 1          | ✓ |
| ✓ | 1,2<br>0          | 0               | 0          | ✓ |

Passed all tests! ✓

Correct

**Ex. No. :**

**Date:**

**Register No.:**

**Name:**

**Ex. No: 8.3**

**Date:30/5/24**

**Register No.: 231401043 Name: JEEVITHA.R**

## **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-letterlong** 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 = "AAAAAAAAAAAAAA"

**Output:** ["AAAAAAAAAA"]

| <b>Input</b>                     | <b>Result</b>            | <b>For example:</b> |
|----------------------------------|--------------------------|---------------------|
| AAAAACCCCCAAAAACCCCCCAAAAAGGGTTT | AAAAACCCCC<br>CCCCCAAAAA |                     |

## **Program:**

```

s = input() j
= [] repeated = set()
for i in range(len(s) -
9):
    sequence =
    s[i:i+10]    if sequence
    in j:

```

```
repeated.add(sequence)
else:
    j.append(sequence)
l=list(repeated)
l=list(reversed(l)) for i in
l:    print(i)
```

## Output:

|   | Input                           | Expected                 | Got                      |   |
|---|---------------------------------|--------------------------|--------------------------|---|
| ✓ | AAAAACCCCCAAAAACCCCCCAAAAGGGTTT | AAAAACCCCC<br>CCCCCAAAAA | AAAAACCCCC<br>CCCCCAAAAA | ✓ |
| ✓ | AAAAAAAAAAAAAA                  | AAAAAAAAAA               | AAAAAAAAAA               | ✓ |

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

**Ex. No. :**

**Date:**

**Register No.:**

**Name:**

**Ex.No:8.4**

**Date:30/5/24**

**Register No.: 231401043 Name: JEEVITHA.R**

## **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](#).

**Example 1:**

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

**Output:** 2

**Example 2:**

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

**Output:** 3

**For example:**

| <b>Input</b> | <b>Result</b> |
|--------------|---------------|
| 1 3 4 4 2    | 4             |

**Program:**

```
n = input().split(" ")  
n = list(n) for i in range(len(n)):
```

```
for j in range(i+1,len(n)):      if  
n[i] == n[j]:  
print(n[i])          exit(0)
```

## Output:

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

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

**Ex. No. :**

**Date:**

**Register No.:**

**Name:**

**Ex. No:8.5.**                   **Date:30/5/24 Register**  
**Register No.: 231401043**   **Name: JEEVITHA.R**

## **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 Input:**

5 4

1 2 8 6 5

2 6 8 10

**Sample Output:**

1 5 10

3

**Sample Input:**

5 5

1 2 3 4 5

1 2 3 4 5

**Sample Output:**

NO SUCH ELEMENTS

**For example:**

| <b>Input</b>                    | <b>Result</b> |
|---------------------------------|---------------|
| 5 4<br>1 2 8 6<br>5<br>2 6 8 10 | 1 5 10<br>3   |

## Program:

```

a=input() d=[]

b=input() c=input()

b=tuple(b.split(" "))

c=tuple(c.split(" "))

for i in b: if i not in

c:

    d.append(i) for

i in c: if i

not in b:

    d.append(i) for i in

range(len(d)):

    print(int(d[i]),end=' ') print()

print(len(d))

```

## Output:

**Ex. No.** :

**Date:**

**Register No.:**

**Name:**

|   | <b>Input</b>                 | <b>Expected</b> | <b>Got</b>  |   |
|---|------------------------------|-----------------|-------------|---|
| ✓ | 5 4<br>1 2 8 6 5<br>2 6 8 10 | 1 5 10<br>3     | 1 5 10<br>3 | ✓ |
| ✓ | 3 3<br>10 10 10<br>10 11 12  | 11 12<br>2      | 11 12<br>2  | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

**Ex. No. : 8.6**

**Date:30/5/24**

**Register No.: 231401043 Name: JEEVITHA.R**

## **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:**

| <b>Input</b>      | <b>Result</b> |
|-------------------|---------------|
| hello world<br>ad | 1             |

**Program:**

```
a=input()  
b=input()  
c=set()  
for i in a:  
    for j in b:  
        if j in i:  
            print(i)
```

**c.add(i) print(len(c))**

Output:

|   | <b>Input</b>                                   | <b>Expected</b> | <b>Got</b> |   |
|---|--|-----------------|------------|---|
| ✓ | hello world<br>ad                              | 1               | 1          | ✓ |
| ✓ | Welcome to REC<br>e                            | 1               | 1          | ✓ |
| ✓ | Faculty Upskilling in Python Programming<br>ak | 2               | 2          | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

Ex. No. : 8.7

Date: 30/5/24

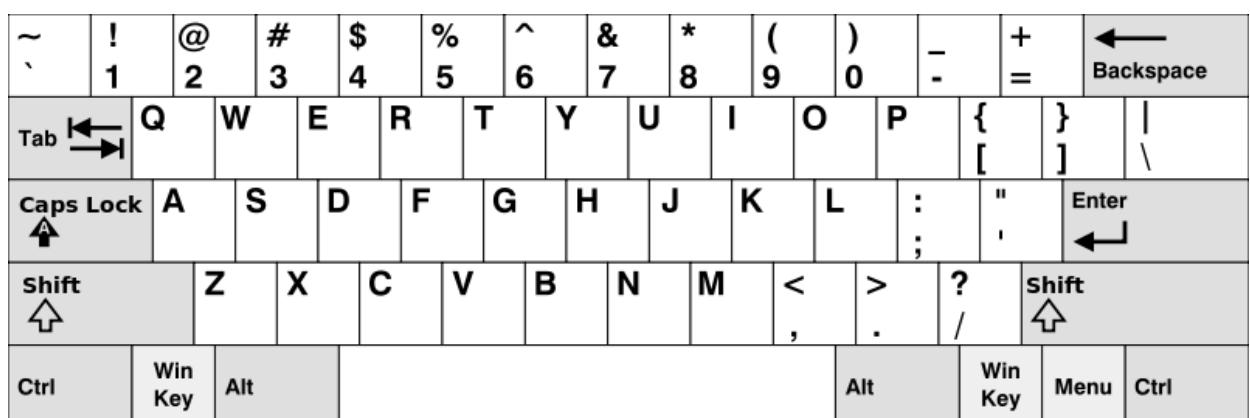
Register No.: 231401043 Name: JEEVITHA.R

## 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"]

**For example:**

| Input | Result |
|-------|--------|
|       |        |

|        |        |
|--------|--------|
| 4      | Alaska |
| Hello  | Dad    |
| Alaska |        |
| Dad    |        |
| Peace  |        |

## Program:

```
def findWords(words):
    row1 = set('qwertyuiop')
    row2 = set('asdfghjkl')    row3
    = set('zxcvbnm')

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

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

## Output:

|   | <b>Input</b>                         | <b>Expected</b> | <b>Got</b>    |   |
|---|--------------------------------------|-----------------|---------------|---|
| ✓ | 4<br>Hello<br>Alaska<br>Dad<br>Peace | Alaska<br>Dad   | Alaska<br>Dad | ✓ |
| ✓ | 1<br>omk                             | No words        | No words      | ✓ |
| ✓ | 2<br>adsfd<br>afd                    | adsfd<br>afd    | adsfd<br>afd  | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

# 09 – Dictionary

Ex. No. : 9.1

Date: 2/6/24

Register No.: 231401043

Name: JEEVITHA.R

## Uncommon words

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

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

Example 1:

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

Output: ["sweet", "sour"] Example

2:

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

Output: ["banana"]

Constraints:

$1 \leq s1.length, s2.length \leq 200$  s1 and s2 consist of lowercase English letters and spaces. s1 and s2 do not have leading or trailing spaces.

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

Note:

Use dictionary to solve the problem **For example:**

| Input                                     | Result     |
|---|------------|
|   |            |
| this apple is sweet<br>this apple is sour | sweet sour |

## Program:

```
a=input().split()  
b=input().split()  
c1,c2,l={},{},[]  
for i in a:  
    c1[i]=c1.get(i,0)+1  
    for j  
        in b:  
            c2[j]=c2.get(j,0)+1  
            for w,c in c1.items():  
                if(c==1 and w not in b):  
                    l.append(w)  
            if(c==1 and  
                w not in a):  
                l.append(w)  
print(*l)
```

## Output:

|   | Input                                     | Expected   | Got        |   |
|---|---|------------|------------|---|
| ✓ | this apple is sweet<br>this apple is sour | sweet sour | sweet sour | ✓ |
| ✓ | apple apple<br>banana                     | banana     | banana     | ✓ |

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

**Ex. No. : 9.2**

**Date: 2/6/24**

**Register No.:231401043**

**Name:JEEVITHA.R**

## **Sort Dictionary by Values Summation**

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

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

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

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

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

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

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

Sample Input:

2

Gfg 6 7 4

Best 7 6 5

Sample Output

Gfg 17

Best 18

**For example:**

| <b>Input</b>                 | <b>Result</b>     |
|------------------------------|-------------------|
| 2<br>Gfg 6 7 4<br>Best 7 6 5 | Gfg 17<br>Best 18 |

**Program:**

```
a=int(input()) d={} for i
```

```
in range(a):    b=input()
b=b.partition(" ")
d[b[0]]=b[-1].split(" ")
n=list(d.values())
k=list(d.keys())
for i in range(len(n)):
    s=0    for j in
    range(len(n[i])):
        s+=int(n[i][j])
        d.update({k[i]:s})
l=list(d.items())
if(l[0][1]<l[1][1]):    for
k,v in d.items():
    print(k,v) else:    j=1
    for k,v in d.items():
        if(j==1):
            k1,v1=k,v          j+=1
        else:
            print(k,v)
            print(k1,v1)
```

Output:

|   | <b>Input</b>                 | <b>Expected</b>   | <b>Got</b>        |   |
|---|------------------------------|-------------------|-------------------|---|
| ✓ | 2<br>Gfg 6 7 4<br>Best 7 6 5 | Gfg 17<br>Best 18 | Gfg 17<br>Best 18 | ✓ |
| ✓ | 2<br>Gfg 6 6<br>Best 5 5     | Best 10<br>Gfg 12 | Best 10<br>Gfg 12 | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

**Ex. No. : 9.3**

**Date: 2/6/24**

**Register No.: 231401043 Name: JEEVITHA.R**

## **Winner of Election**

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

### **Examples:**

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

Output : John

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

### **Sample Input:**

10  
John  
John  
Johny Jamie  
Jamie Johny  
Jack  
Johny  
Johny  
Jackie

### **Sample Output:**

Johny

### **For example:**

| Input | Result |
|-------|--------|
|       |        |

|        | Johny  |
|--------|--------|
| 10     |        |
| John   |        |
| John   |        |
| Johny  |        |
| Jamie  |        |
| Jamie  |        |
| Johny  |        |
| Jack   |        |
| Input  | Result |
| Johny  |        |
| Johny  |        |
| Jackie |        |

Program:

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

```
votes = {}
```

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

```
    candidate = input()    votes[candidate] =  
    votes.get(candidate, 0) + 1
```

```
max_votes = max(votes.values()) max_candidates =  
[candidate for candidate, count in votes.items() if  
count == max_votes]
```

```
print(min(max_candidates))
```

Output:

|   | <b>Input</b>   | <b>Expected</b> | <b>Got</b> |   |
|---|--|-----------------|------------|---|
| ✓ | 10<br>John<br>John<br>Johny<br>Jamie<br>Jamie<br>Johny<br>Jack<br>Johny<br>Johny<br>Jackie | Johny           | Johny      | ✓ |
| ✓ | 6<br>Ida<br>Ida<br>Ida<br>Kiruba<br>Kiruba<br>Kiruba                                       | Ida             | Ida        | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

**Ex. No. : 9.4**

**Date: 2/6/24**

**Register No.: 231401043 Name: JEEVITHA.R**

## **Student Record**

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

1. Identify the student with the highest average score
2. Identify the student who has the highest Assignment marks
3. Identify the student with the Lowest lab marks
4. Identify the student with the lowest average score Note:  
If more than one student has the same score display all the student names

Sample input:

4

James 67 89 56

Lalith 89 45 45

Ram 89 89 89

Sita 70 70 70 Sample

Output:

Ram

James Ram

Lalith

Lalith

## Program:

```
n = int(input()) max_average = float('-inf')
min_average = float('inf') max_assignment =
float('-inf') min_lab      =      float('inf')
max_average_students      =      []
max_assignment_students    =      []
min_lab_students = [] min_average_students
= [] for _ in range(n):      name, test,
assignment, lab = input().split()      test =
int(test)      assignment = int(assignment)
lab = int(lab)      average = (test + assignment
+ lab) / 3      if average > max_average:
max_average      =      average
max_average_students = [name]      elif
average == max_average:
max_average_students.append(name)      if
average < min_average:      min_average =
average      min_average_students = [name]
elif      average == min_average:
min_average_students.append(name)      if
assignment > max_assignment:
max_assignment      =      assignment
max_assignment_students = [name]      elif
assignment == max_assignment:
max_assignment_students.append(name)      if lab < min_lab:      min_lab = lab
min_lab_students = [name]      elif lab == min_lab:
min_lab_students.append(name)
print(*sorted(max_average_students)) print(*sorted(max_assignment_students))
print(*sorted(min_lab_students))
```

```
print(*sorted(min_average_students))
```

## Output:

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

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

**Ex. No.** : 9.5

**Date:** 2/6/24

**Register No.:** 231401043    **Name:** JEEVITHA.R

## **Scramble Score**

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

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

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

The points associated with each letter are shown below:

Points Letters

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

2 D and G

3 B, C, M and P

4 F, H, V, W and Y

5 K

8 J and X

10 Q and Z

Sample Input

REC

Sample Output

REC is worth 5 points.

## **Program:**

```
letter_scores = {  
    'A': 1, 'E': 1, 'T': 1, 'L': 1, 'N': 1, 'O': 1, 'R': 1, 'S': 1, 'U': 1, 'D':  
    2, 'G': 2,  
    'B': 3, 'C': 3, 'M': 3, 'P': 3,  
    'F': 4, 'H': 4, 'V': 4, 'W': 4, 'Y': 4,  
}
```

```
'K': 5,  
'J': 8, 'X': 8,  
'Q': 10, 'Z': 10  
}  
word = input().upper() score =  
sum(letter_scores.get(letter, 0) for letter in word) print(word,"is  
worth",score,"points.")
```

## Output:

|   | <b>Input</b> | <b>Expected</b>        | <b>Got</b>             |   |
|---|--------------|------------------------|------------------------|---|
| ✓ | GOD          | GOD is worth 5 points. | GOD is worth 5 points. | ✓ |
| ✓ | REC          | REC is worth 5 points. | REC is worth 5 points. | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

# 10 - Searching & Sorting

Ex. No. : 10.1

Date: 4.6.2024

Register No.: 231401043 Name: JEEVITHA.R

## Merge Sort

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

For example:

| Input          | Result    |
|----------------|-----------|
|                | 3 4 5 6 8 |
| 5<br>6 5 4 3 8 |           |

Program:

```
a=int(input()) l=[]
l.extend(input().split())
for i in range(a-1):
    for j in range(a-1):
        if(int(l[j])>int(l[j+1])):
            t=int(l[j])
            l[j]=int(l[j+1])
            l[j+1]=t
for i in range(a):
    print(int(l[i]),end=" ")
```

## Output:

|   | <b>Input</b>                    | <b>Expected</b>            | <b>Got</b>             |
|---|---------------------------------|----------------------------|------------------------|
| ✓ | 5<br>6 5 4 3 8                  | 3 4 5 6 8                  | 3 4 5 6 8              |
| ✓ | 9<br>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 5 |
| ✓ | 4<br>86 43 23 49                | 23 43 49 86                | 23 43 49 86            |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

Ex. No. : 10.2

Date: 4.6.24

Register No.: 231401043 Name: JEEVITHA.R

## 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](#) is sorted in numSwaps swaps., where numSwaps is the number of swaps that took place.
2. First Element: firstElement, the *first* element in the sorted [list](#).
3. Last Element: lastElement, the *last* element in the sorted [list](#).

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

Array is sorted in 3 swaps.

First Element: 1

Last Element: 6

### Input Format

The first line contains an integer,n , the size of the [list](#) a .  
The second line contains n, space-separated integers a[i].

### Constraints

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

### Output Format

You must print the following three lines of output:

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

### Sample Input 0

3

1 2 3

### Sample Output 0

[List](#) is sorted in 0 swaps.

First Element: 1

Last Element: 3

### For example:

| <b>Input</b>   | <b>Result</b>   |
|----------------|---|
| 3<br>3 2 1     | List is sorted in 3 swaps.<br>First Element: 1<br>Last Element: 3 |
| 5<br>1 9 2 8 4 | List is sorted in 4 swaps.<br>First Element: 1<br>Last Element: 9 |

## Program:

```
def bubble_sort(arr):
    n = len(arr)    swaps =
    0

    for i in range(n):      for j in range(0, ni-1):
        if arr[j] > arr[j + 1]:      # Swap
            elements      arr[j], arr[j + 1] = arr[j +
            1], arr[j]      swaps += 1

    return swaps
```

```
# Input the size of the list n
= int(input())
```

```
# Input the list of integers arr = list(map(int,
input().split()))
```

```
# Perform bubble sort and count the number of swaps
num_swaps = bubble_sort(arr)
```

```
# Print the number of swaps
print("List is sorted in", num_swaps, "swaps.")
```

```
# Print the first element print("First
Element:", arr[0])
```

```
# Print the last element print("Last
Element:", arr[-1])
```

## Output:

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

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

**Ex. No.** : **10.3**

**Date:** **4.6.2024**

**Register No.:** **231401043**    **Name:** **JEEVITHA.R**

### **Peak Element**

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

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

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

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

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

#### **Input Format**

The first line contains a single integer  $n$ , the length of  $A$ . The second line contains  $n$  space-separated integers,  $A[i]$ .

#### **Output Format**

Print peak numbers separated by space.

#### **Sample Input**

5

8 9 10 2 6

#### **Sample Output**

10 6

#### **For example:**

| <b>Input</b>  | <b>Result</b> |
|---------------|---------------|
| 4<br>12 3 6 8 | 12 8          |

## Program:

```
def find_peak(arr):
    peak_elements = [] # Check for the
    first element if arr[0] >= arr[1]:
        peak_elements.append(arr[0])

        # Check for middle elements for
        i in range(1, len(arr) - 1): if arr[i
        - 1] <= arr[i] >= arr[i + 1]:
            peak_elements.append(arr[i])

        # Check for the last element if
        arr[-1] >= arr[-2]:
            peak_elements.append(arr[-1])

    return peak_elements

# Input the length of the list n
n = int(input())

# Input the list of integers arr = list(map(int,
input().split()))

# Find peak elements and print the result
peak_elements = find_peak(arr) print(*peak_elements)
```

## Output:

|   | Input                | Expected  | Got       |   |
|---|----------------------|-----------|-----------|---|
| ✓ | 7<br>15 7 10 8 9 4 6 | 15 10 9 6 | 15 10 9 6 | ✓ |
| ✓ | 4<br>12 3 6 8        | 12 8      | 12 8      | ✓ |

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

Ex. No. : 10.4  
**JEEVITHA.R**

Date: 4.6.2024 Register No.: 231401043 Name:

## Binary Search

Write a Python program for binary search.

**For example:**

| Input             | Result |
|-------------------|--------|
| 1 2 3 5 8<br>6    | False  |
| 3 5 9 45 42<br>42 | True   |

**Program:**

```
a = input().split(",")
b = input() print(b in a)
```

**Output:**

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

Passed all tests! ✓

**Correct**  
Marks for this submission: 1.00/1.00.

**Ex. No.** : 10.5

**Date:** 4.6.2024

**Register No.:** 231401043 **Name:** JEEVITHA.R

### **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:**

| <b>Input</b> | <b>Result</b>     |
|--------------|-------------------|
| 4 3 5 3 4 5  | 3 2<br>4 2<br>5 2 |

### **Program:**

```
def count_frequency(arr):
    frequency = {}

    # Count the frequency of each number in the list    for
    num in arr:
        frequency[num] = frequency.get(num, 0) + 1
```

```

# Sort the dictionary based on keys
sorted_frequency = sorted(frequency.items())

# Print the frequency of each number    for
num, freq in sorted_frequency:
    print(num, freq)

# Input the list of numbers arr = list(map(int,
input().split()))

# Count the frequency and print the result
count_frequency(arr)

```

## Output:

|   | <b>Input</b>    | <b>Expected</b>                  | <b>Got</b>                       |   |
|---|-----------------|----------------------------------|----------------------------------|---|
| ✓ | 4 3 5 3 4 5     | 3 2<br>4 2<br>5 2                | 3 2<br>4 2<br>5 2                | ✓ |
| ✓ | 12 4 4 4 2 3 5  | 2 1<br>3 1<br>4 3<br>5 1<br>12 1 | 2 1<br>3 1<br>4 3<br>5 1<br>12 1 | ✓ |
| ✓ | 5 4 5 4 6 5 7 3 | 3 1<br>4 2<br>5 3<br>6 1<br>7 1  | 3 1<br>4 2<br>5 3<br>6 1<br>7 1  | ✓ |

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

# 11-Exception Handling

Ex.no:11.1

Date:6.6.2024

Register No.: 231401043 Name: JEEVITHA.R

## 1)Problem Description:

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.

## PROGRAM:

```
import math try:  
    a=float(input())  
    if a>=0:  
        b=a**0.5      c=".2f"%b      print("The  
square root of",float(a),"is",c)    else:  
        print("Error: Cannot calculate the square root of a negative number.")  
    except EOFError:    print("Error: could not convert string to float") except  
    ValueError:  
        print("Error: could not convert string to float")
```

## OUTPUT:

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

Ex.no:11.2

Date:6.6.2024

Register No: 231401039

Name: A. Isai Priya

2) 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.

PROGRAM:

try:

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

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

```
    print("Division result:",c)
```

```
print("Modulo result:",d) OUTPUT:
```

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

Passed all tests! ✓

Ex.no:12.3

Date:6.6.2024

Register No.: 231401043 Name: JEEVITHA.R

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

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

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

PROGRAM:

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

OUTPUT:

|   | Input    | Expected                                | Got                                     |   |
|---|----------|---|---|---|
| ✓ | 10<br>2  | 5.0                                     | 5.0                                     | ✓ |
| ✓ | 10<br>0  | Error: Cannot divide or modulo by zero. | Error: Cannot divide or modulo by zero. | ✓ |
| ✓ | ten<br>5 | Error: Non-numeric input provided.      | Error: Non-numeric input provided.      | ✓ |

Passed all tests! ✓

Ex.no:12.5

Date:6.6.2024

**Register No.: 231401043    Name: JEEVITHA.R**

4) 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.

PROGRAM:

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

OUTPUT:

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

Passed all tests! ✓

Ex.no:12.5

Date:6.6.2024

Register No.: 231401043 Name: JEEVITHA.R

5) 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.

PROGRAM:

```

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

```

OUTPUT:

|   | <b>Input</b> | <b>Expected</b>                  | <b>Got</b>                       |   |
|---|--------------|----------------------------------|----------------------------------|---|
| ✓ | 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. | ✓ |

Passed all tests! ✓

**Ex.no:12.1**

**Date:6.6.2024**

**Register No.: 231401043 Name: JEEVITHA.R**

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

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

#### Problem Statement

Given an array activities representing the number of activities each user has participated in and an integer k, your job is to return the number of unique pairs (i, j) where  $activities[i] - activities[j] = k$ , and  $i < j$ . The absolute difference between the activities should be exactly k. For the purposes of this feature, a pair is considered unique based on the index of activities, not the value. That is, if there are two users with the same number of activities, they are considered distinct entities.

#### Input Format

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

The second line contains n space-separated integers, nums[i]. The third line contains an integer, k.

#### Output Format

Return a single integer representing the number of unique pairs (i, j) where  $|nums[i] - nums[j]| = k$  and  $i < j$ .

#### Constraints:

$$1 \leq n \leq 10^5$$

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

$0 \leq k \leq 10^4$

PROGRAM:

```
from collections import Counter
n = int(input())
nums = list(map(int, input().split()))
k = int(input())
if k != 0:
    freq = Counter(nums)
    c = 0
    for x in freq:
        if x + k in freq:
            c += freq[x] * freq[x + k]
    else:
        freq = Counter(nums)
        c = sum(freq[x] *
               (freq[x] - 1) // 2 for x in freq)
    print(c)
```

OUTPUT:

|   | Input               | Expected | Got |   |
|---|---------------------|----------|-----|---|
| ✓ | 4<br>1 2 3 4<br>1   | 3        | 3   | ✓ |
| ✓ | 5<br>1 3 1 5 4<br>0 | 1        | 1   | ✓ |
| ✓ | 4<br>1 2 2 1<br>1   | 4        | 4   | ✓ |

Passed all tests! ✓

Ex.no:12.2

Date:6.6.2024

Register No.: 231401043 Name: JEEVITHA.R

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

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

PROGRAM:

```
import math  
n = int(input()) is_power_of_four = n > 0 and  
math.log(n, 4).is_integer() print(is_power_of_four)
```

OUTPUT:

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

Passed all tests! ✓

Ex. No. : 12.3

Date: 6..6.2024

Register No.: 231401043 Name: JEEVITHA.R

## **Priya**

3.Dr. John Wesley maintains a spreadsheet with student records for academic evaluation. The spreadsheet contains various data fields including student IDs, marks, class names, and student names. The goal is to develop a system that can calculate the average marks of all students listed in the spreadsheet.

### **Problem Statement:**

Create a Python-based solution that can parse input data representing a list of students with their respective marks and other details, and compute the average marks. The input may present these details in any order, so the solution must be adaptable to this variability.

### **Input Format:**

The first line contains an integer N, the total number of students.

The second line lists column names in any order (ID, NAME, MARKS, CLASS).

The next N lines provide student data corresponding to the column headers.

### **Output Format:**

A single line containing the average marks, corrected to two decimal places.

### **Constraints:**

$1 \leq N \leq 100$

Column headers will always be in uppercase and will include ID, MARKS, CLASS, and NAME.

Marks will be non-negative integers.

### **PROGRAM:**

try:

n=int(input())

```

Otle=input().split() index=Otle.index('MARKS')
l=[] for i in range(n):
x=input().split()
l.append(int(x[index]))
print(f"{sum(l)/len(l):.2f}") except:
print("0.00")

```

OUTPUT:

|   | <b>Input</b>   | <b>Expected</b> | <b>Got</b> |   |
|---|--|-----------------|------------|---|
| ✓ | 3<br>ID NAME MARKS CLASS<br>101 John 78 Science<br>102 Doe 85 Math<br>103 Smith 90 History | 84.33           | 84.33      | ✓ |
| ✓ | 3<br>MARKS CLASS NAME ID<br>78 Science John 101<br>85 Math Doe 102<br>90 History Smith 103 | 84.33           | 84.33      | ✓ |

Ex.no:12.4

Date:6.6.2024

**Register No.: 231401043 Name: JEEVITHA.R**

4) 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.

**PROGRAM:**

```
d = {}  
while True:  
    try:  
        book = input().split(',')      if  
                                         len(book) < 2:  
            continue      book_name =  
            book[0].strip()      category =  
            book[1].strip()      if category  
            in d:
```

```

d[category].append(book_na
me)      else:
    d[category] = [book_name]

except EOFError:
    break

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

```

#### PROGRAM:

|   | <b>Input</b>  | <b>Expected</b>  | <b>Got</b>   |
|---|---|--|--|
| ✓ | Introduction to Programming, Programming Advanced Calculus, Mathematics | Programming: Introduction to Programming<br>Mathematics: Advanced Calculus | Programming: Introduction<br>Mathematics: Advanced Cal |
| ✓ | Fictional Reality, Fiction<br>Another World, Fiction                    | Fiction: Fictional Reality, Another World                                  | Fiction: Fictional Reality                             |

Ex.no:12.5

Date:6.6.2024

**Register No.: 231401043    Name: JEEVITHA.R**

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

Problem Statement:

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

**Input Format:**

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

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

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

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

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

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

**Output Format:**

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

**Constraints:**

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

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

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

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

**PROGRAM:**

```
a = int(input()) shoes =
list(map(int,input().split()))
N = int(input())
t = 0
for i
in range(N):
```

```

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

if      a[0]      in      shoes:
    shoes.remove(a[0])      t += a[1]
print(t)

```

OUTPUT:

|   | <b>Input</b>  | <b>Expected</b> | <b>Got</b> |   |
|---|---|-----------------|------------|---|
| ✓ | 10<br>2 3 4 5 6 8 7 6 5 18<br>6<br>6 55<br>6 45<br>6 55<br>4 40<br>18 60<br>10 50 | 200             | 200        | ✓ |
| ✓ | 5<br>5 5 5 5 5<br>5<br>5 10<br>5 10<br>5 10<br>5 10<br>5 10                       | 50              | 50         | ✓ |
| ✓ | 4<br>4 4 6 6<br>5<br>4 25<br>4 25<br>6 30<br>6 55<br>6 55                         | 135             | 135        | ✓ |