

## **05 - List in Python**



Ex. No. : 5.1

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### **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  $0 \leq i < n$ .

```
n = int(input().strip())
arr = [int(input().strip()) for _ in range(n)]
total_sum = sum(arr)
left_sum = 0
for i in range(n):
    total_sum -= arr[i]
    if left_sum == total_sum:
        print(i)
        break
    left_sum += arr[i]
```



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,  $\text{arr}[2]=3$  is the pivot between the two subarrays.
- The index of the pivot is 2.

Sample Case 1

Sample Input 1

3  
1  
2  
1

Sample Output 1  
1

Explanation 1

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

**For example:**

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





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### 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.

```
t=int(input())
for a in range(t):
    n=int(input())
    l=[]
    for b in range(n):
        l.append(int(input()))
    k=int(input())
    i=0
    j=1
    flag=0
    while i<n and j<n:
        if i!=j and l[j]-l[i]==k:
            flag=1
            break
        elif l[j]-l[i]<k:
            j+=1
        else:
            i+=1
    if flag:
        print(1)
    else:
        print(0)
```



Input

1

3

1

3

5

4

Output:

1

Input

1

3

1

3

5

99

Output

0

**For example:**

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



Ex. No. : 5.3

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### Count Elements

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

```
n=int(input())
l=[]
l1=[]
for i in range(n):
    l.append(int(input()))
for i in l:
    if i not in l1:
        l1.append(i)
for i in l1:
    print(i,"occurs",l.count(i),"times")
```



## 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





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### **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

```
n=int(input())  
l=[]  
for i in range(n):  
    l.append(int(input()))  
new=[]  
for i in l:  
    if i not in new:  
        new.append(i)  
for i in new:  
    print(i,end=' ')
```



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



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### **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.

```
l=[]  
for i in range(11):  
    l.append(int(input()))  
print("ITEM to be inserted:%d"%l[10])  
print("After insertion array is:")  
l.sort()  
for i in l:  
    print(i)
```



### Sample Test Cases

#### Test Case 1

##### Input

1  
3  
4  
5  
6  
7  
8  
9  
10  
11  
2

##### Output

ITEM to be inserted:2  
After insertion array is:

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11

#### Test Case 2

##### Input

11  
22  
33  
55  
66  
77  
88  
99  
110  
120  
44

##### Output

ITEM to be inserted:44  
After insertion array is:

11  
22  
33  
44  
55  
66  
77  
88  
99  
110  
120



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### **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.

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

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

```
f=[]
```

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

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

```
        f.append(i)
```

```
if(p>len(f)):
```

```
    print(0)
```

```
else:
```

```
    print(f[p-1])
```



**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 3	5
10 5	0
1 1	1



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## 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

Zippped List : List which combined both list1 and list2

```
m=int(input())
n=int(input())
list1=[]
list2=[]
for i in range(m):
    col=[]
    for j in range(n):
        col.append(int(input()))
    list1.append(col)
for i in range(m):
    col=[]
    for j in range(n):
        col.append(int(input()))
    list2.append(col)
zipped=[]
for i in range(m):
    zipped.append(list1[i]+list2[i])
print(zipped)
```



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]]





Ex. No. : 5.8

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## **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

```
n1=int(input())
l=[]
for i in range(n1):
    l.append(int(input()))
n2=int(input())
for j in range(n2):
    elt=int(input())
    if(elt not in l):
        l.append(elt)
l.sort()
for i in l:
    print(i,end=" ")
```



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



Ex. No. : 5.9

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### 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.

```
n=int(input())
l=[]
for i in range(n):
    l.append(int(input()))
a=int(input())
if a not in l:
    print(a,"is not present in the array.")
else:
    l1=[]
    for i in range(len(l)):
        if l[i]==a:
            l1.append(i)
    for i in l1:
        print(a,"is present at location %d."%(i+1))
    print(a,"is present",l.count(a),"times in the array.")
```



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

5  
6  
5  
7

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

5 is present at location 1

5 is present at location 3

5 is present 2 times in the array.

Sample Test Cases

Test Case 1

Input

4  
5  
6  
5  
7  
5

Output

5 is present at location 1.

5 is present at location 3.

5 is present 2 times in the array.

Test Case 2

Input

5  
67  
80  
45  
97  
100  
50

Output

50 is not present in the array.



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### **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"

```
inList = [int(input()) for i in range(int(input()))]
def isIncreasing(inList):
    for i in range(len(inList) - 1):
        if inList[i] >= inList[i + 1]: return False
    return True
def isDecreasing(inList):
    for i in range(len(inList) - 1):
        if inList[i] <= inList[i + 1]: return False
    return True
def isStrictlyIncreasingOrDecreasing(n, inList):
    if isIncreasing(inList) or isDecreasing(inList): return True
    for i in range(n):
        tempList = inList[:i] + inList[i+1:]
        if isIncreasing(tempList) or isDecreasing(tempList): return True
    return False
print(isStrictlyIncreasingOrDecreasing(len(inList), inList))
```



## Sample Test Case

Input

7

1

2

3

0

4

5

6

Output

True

