

05 - List in Python

Ex. No. : 5.1

Date: 17.04.24

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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 $0 \leq i < n$.

CODING:

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

```
l=[]
```

```
s1=0
```

```
s2=0
```

```
l1=[]
```

```
l2=[]
```

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

```
    l.append(int(input()))
```

```
for i in range(1,(len(l)-1)):
```

```
    l1.extend(l[:i])
```

```
    l2.extend(l[i+1:])
```

```
    for j in l1:
```

```
        s1+=j
```

```
    for k in l2:
```

```
        s2+=k
```

```
if s1==s2:  
    print(i)  
    break  
else:  
    s1=0  
    s2=0  
    del l1[:]  
    del l2[:]
```

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

Ex. No. : 5.2

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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.

CODING:

```
a=int(input())
for i in range(a):
    b=int(input())
    c=[]
    flag=0
    for i in range(b):
        c.append(int(input()))
    k=int(input())
    for i in c:
        for j in c:
            if i!=j:
                if i-j==k or j-i ==k:
                    flag=1
```

print(flag)

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

CODING:

```
n=int(input())
a=[]
for i in range(n):
    a.append(int(input()))
b=[]
for i in a:
    if i not in b:
        b.append(i)
for i in b:
    print(i,"occurs",a.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

Ex. No. : 5.4

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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

CODING:

```
n=int(input())  
arr=[]  
for i in range(n):  
    arr.append(int(input()))  
distinct=set(arr)  
print(" ".join(map(str,distinct)))
```

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

Example Input:

5
1
2
2
3
4

Output:

1 2 3 4

Example Input:

6
1
1
2
2
3
3

Output:

1 2 3

For example:

Input Result

5
1
2
2
3

4
1 2 3 4
6
1
1
2
2
3
3
1 2 3

Ex. No. : 5.4

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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.

CODING:

```
a=[]
for i in range(10):
    a.append(int(input()))
c=int(input())
for i in range(10):
    if c<a[i]:
        a.insert(i,c)
        break
print("ITEM to be
inserted:",end=")
print(c)
print("After insertion
array is:")
for i in a:
    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

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

Ex. No. : 5.6

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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^{th} element of the [list](#), sorted ascending. If there is no p^{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.

CODING:

```
n=int(input())
p=int(input())
a=[]
for i in range(1,n+1):
    if n%i==0:
        a.append(i)
if p==1 and len(a)==1:
    print("1")
elif(p>len(a)):
    print("0")
else:
    print(a[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

Ex. No. : 5.7

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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

CODING:

```
a=int(input())
b=int(input())
a1=[]
b1=[]
a2=[]
b2=[]
c2=[]
for i in range(a*b):
    a1.append(int(input()))
for i in range(b*a):
    b1.append(int(input()))
a2.extend(a1[:b])
a2.extend(b1[:b])
b2.extend(a1[b:])
b2.extend(b1[b:])
c2.append(a2)
c2.append(b2)
print(c2)
```

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

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())
a1=[]
for i in range(n1):
    a1.append(int(input()))
n2=int(input())
a2=[]
for i in range(n2):
    a2.append(int(input()))
ms=set(a1+a2)
ma=sorted(ms)
for i in ma:
    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

	Input	Expected	Got	
✓	5 1 2 3 6 9 4 2 4 5 10	1 2 3 4 5 6 9 10	1 2 3 4 5 6 9 10	✓
✓	7 4 7 8 10 12 30 35 9 1 3 4 5 7 8 11 13 22	1 3 4 5 7 8 10 11 12 13 22 30 35	1 3 4 5 7 8 10 11 12 13 22 30 35	✓

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.

CODING:

```
n=int(input())
arr=[]
for i in range(n):
    arr.append(int(input()))
a=int(input())
b=[]
count=0
for i in range(n):
    if arr[i]==a:
        count+=1
        b.append(i+1)
if count==0:
    print(a,"is not present in the array.")
else:
    for loc in b:
        print(a,"is present at location %d."%loc)
```

print(a,"is present",count,"times in the array.")

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

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.

Ex. No. : 5.10

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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"

CODING:

```
a=int(input())
l=[]
for i in range(a):
    l.append(int(input()))
la=sorted(l)
ld=sorted(l,reverse=True)
if l==la or l==ld:
    print(True)
else:
    f=0
    for i in range(len(l)):
        b=l.pop(i)
        l2a=sorted(l)
        l2b=sorted(l,reverse=True)
        if l==l2a or l==l2d:
            f=1
            break
    else:
        l.insert(i,b)
    if f==0:
```

```

print(False)
else:
    print(True)

```

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

Sample Test Case

Input

7

1

2

3

0

4

5

6

Output

True