WEEK-07-CODING-Lists

1.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	1 2 3 4

Input	Result
4	
6 1 1 2 2 3 3	1 2 3

Coding:

```
def ele():
    n=int(input().strip())
    a=[]
    for _ in range(n):
        while True:
            e=int(input().strip())
            a.append(e)
            break

    d=set(a)
    d=sorted(d)
    print(' '.join(map(str,d)))
ele()
```

Output:

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

Passed all tests! ✓

2. Given an integer n, return an list of length n + 1 such that for each i (0 <= i <= n), ans[i] is the number of 1's in the binary representation of i.

Example:

Input: n = 2
Output: [0,1,1]
Explanation:
0 --> 0
1 --> 1
2 --> 10

Example2:
Input: n = 5
Output: [0,1,1,2,1,2]
Explanation:
0 --> 0
1 --> 1
2 --> 10
3 --> 11
4 --> 100
5 --> 101

Note: Complete the given function alone
For example:

Test	Result
print(CountingBits(5))	[0, 1, 1, 2, 1, 2]

Coding:

```
def CountingBits(n):
    res=[]
    for i in range(n+1):
        res.append(bin(i).count('1'))
    return res
```

Output:

	Test	Expected	Got	
✓	print(CountingBits(2))	[0, 1, 1]	[0, 1, 1]	✓
✓	print(CountingBits(5))	[0, 1, 1, 2, 1, 2]	[0, 1, 1, 2, 1, 2]	✓

Passed all tests! ✓

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

Input Format

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

Output format

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

Example

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	0

Input	Result
1 3 5 99	

Coding:

```
def pair(arr,n,k):
    i , j = 0, 1

    while i < n and j < n:
        if i != j and arr[j]-arr[i]==k:
            return 1
        elif arr[j] - arr[i] < k:
            j +=1
        else:
            i +=1
        if i == j:
            j +=1

    return 0

def main():
    t = int(input().strip())
    for _ in range(t):
        n = int(input().strip())
        arr = []
        for _ in range(n):
            arr.append(int(input().strip()))
        k = int(input().strip())
        print(pair(arr,n,k))

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

Output:

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

Passed all tests! ✓

4. 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

Coding:

```
def fry(ar):
    f={}
    for e in ar:

        if e in f:
          f[e] +=1
        else:
          f[e] = 1

    for e, value in f.items():
         print(f"{e} occurs {value} times")

n = int(input())
ar=[]
for i in range(n):
    e=int(input())
    ar.append(e)

fry(ar)
```

Output:

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

Passed all tests! ✓

5. An array is monotonic if it is either **monotone increasing** or **monotone decreasing**. An array A is monotone increasing if for all i <= j, **A[i] <= A[j]**. An array A is monotone decreasing if for all i <= j, **A[i] >= A[j]**.

Write a program if n array is monotonic or not. Print "True" if is monotonic or "False" if it is not. Array can be monotone increasing or decreasing.

Input Format:

First line n-get number of elements

Next n Lines is the array of elements

Output Format:

True ,if array is monotone increasing or decreasing.

otherwise False is printed

Sample Input1

4

5

6

7

8

Sample Output1

True

Sample Input2

4

6

5

4

3

Sample Output2

True

Sample Input 3

4

6

7

8

7

Sample Output3

False

For example:

Input	Result
4 6 5 4 3	True

Coding:

```
n=int(input())

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

inc = True
dec = True

for i in range(1,n):
    if arr[i] > arr[i-1]:
        dec = False
    if arr[i] < arr[i-1]:
        inc = False

if inc or dec:
    print("True")
else:
    print("False")
```

Output:

	Input	Expected	Got	
✓	4 6 5 4 3	True	True	✓
✓	4 3 5 7 4	False	False	✓
✓	4 1 6 9 2	False	False	✓
✓	4 9 6 4 2	True	True	✓
✓	3 2 1 4	False	False	✓

Passed all tests! ✓

6. Given two arrays of positive integers, for each element in the second array, find the total number of elements in the first array which are *less than or equal to* that element. Store the values determined in an array.

For example, if the first array is *[1, 2, 3]* and the second array is *[2, 4]*, then there are *2* elements in the first array *less than or equal to 2.* There are *3* elements in the first array which are *less than or equal to 4*. We can store these answers in an array, *answer = [2, 3]*.

Program Description

The program must return an array of *m* positive integers, one *for each maxes[i]* representing the total number of elements *nums[j]* satisfying *nums[j] ≤ maxes[i]* where $0 \leq j < n$ and $0 \leq i < m$, in the given order.

The program has the following:

nums[nums[0],...nums[n-1]]: first array of positive integers
maxes[maxes[0],...maxes[n-1]]: second array of positive integers

Constraints

- $2 \leq n, m \leq 10^5$
- $1 \leq nums[j] \leq 10^9$, where $0 \leq j < n$.
- $1 \leq maxes[i] \leq 10^9$, where $0 \leq i < m$.

Input Format For Custom Testing

Input from stdin will be processed as follows and passed to the program.

The first line contains an integer *n*, the number of elements in *nums*.
The next *n* lines each contain an integer describing *nums[j]* where $0 \leq j < n$.
The next line contains an integer *m*, the number of elements in *maxes*.
The next *m* lines each contain an integer describing *maxes[i]* where $0 \leq i < m$.

Sample Case 0
Sample Input 0

```
4
1
4
2
4
2
3
5
```

Sample Output 0

```
2
4
```

Explanation 0

We are given $n = 4$, $nums = [1, 4, 2, 4]$, $m = 2$, and $maxes = [3, 5]$.

1. For $maxes[0] = 3$, we have 2 elements in *nums* ($nums[0] = 1$ and $nums[2] = 2$) that are $\leq maxes[0]$.
2. For $maxes[1] = 5$, we have 4 elements in *nums* ($nums[0] = 1$, $nums[1] = 4$, $nums[2] = 2$, and $nums[3] = 4$) that are $\leq maxes[1]$.

Thus, the program returns the array $[2, 4]$ as the answer.

Sample Case 1

Sample Input 1

```
5
2
10
5
4
8
4
3
1
7
8
```

Sample Output 1

```
1
0
```

3
4

Explanation 1

We are given, *n = 5*, *nums = [2, 10, 5, 4, 8]*, *m = 4*, and *maxes = [3, 1, 7, 8]*.

1. For *maxes[0] = 3*, we have *1* element in *nums* (*nums[0] = 2*) that is ≤ *maxes[0]*.
2. For *maxes[1] = 1*, there are *0* elements in *nums* that are ≤ *maxes[1]*.
3. For *maxes[2] = 7*, we have *3* elements in *nums* (*nums[0] = 2*, *nums[2] = 5*, and *nums[3] = 4*) that are ≤ *maxes[2]*.
4. For *maxes[3] = 8*, we have *4* elements in *nums* (*nums[0] = 2*, *nums[2] = 5*, *nums[3] = 4*, and *nums[4] = 8*) that are ≤ *maxes[3]*.

Thus, the program returns the array *[1, 0, 3, 4]* as the answer.

Coding:

```
import bisect
n= int(input())
nums =[int(input()) for _ in range(n)]
m= int(input())
maxes = [int(input()) for _ in range(m)]

nums.sort()

result = []
for maxval in maxes:
    count = bisect.bisect_right(nums, maxval)
    result.append(count)

for res in result:
    print(res)
```

Output:

	Input	Expected	Got	
✓	4 1 4 2 4 2 3 5	2 4	2 4	✓
✓	5 2 10 5 4 8 4 3 1 7 8	1 0 3 4	1 0 3 4	✓

Passed all tests! ✓

7.The program must accept **N** integers and an integer **K** as the input. The program must print every K integers in descending order as the output.

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Note: If **N % K != 0**, then sort the final N%K integers in descending order.

Boundary Condition(s):

1 <= N <= 10^4
-99999 <= Array Element Value <= 99999

Input Format:

The first line contains the values of N and K separated by a space.
The second line contains N integers separated by space(s).

Output Format:

The first line contains N integers.

Example Input/Output 1:

Input:

7 3
48 541 23 68 13 41 6

Output:

541 48 23 68 41 13 6

Explanation:

The first three integers are 48 541 23, after sorting in descending order the integers are **541 48 23**.
The second three integers are 68 13 41, after sorting in descending order the integers are **68 41 13**.
The last integer is **6**.

The integers are **541 48 23 68 41 13 6**
Hence the output is **541 48 23 68 41 13 6**.

Coding:

```
N, K = map(int, input().split())

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

if len(a)< N:
   a.extend([0] * (N - len(array)))

result = []

for i in range(0,N,K):
   chunk = a[i:i + K]
   result.extend(sorted(chunk, reverse=True))

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

Output:

	Input	Expected	Got	
✓	7 3 48 541 23 68 13 41 6	541 48 23 68 41 13 6	541 48 23 68 41 13 6	✓

Passed all tests! ✓

8. Assume you have an array of length ***n*** initialized with all **0**'s and are given ***k*** update operations.

Each operation is represented as a triplet: **[startIndex, endIndex, inc]** which increments each element of subarray **A[startIndex ... endIndex]** (startIndex and endIndex inclusive) with **inc**.

Return the modified array after all ***k*** operations were executed.

Example:

Input:

5

3

1 3 2

2 4 3

0 2 -2

Output:

-2 0 3 5 3

Explanation:

Initial state:

length = 5, updates = [[1,3,2],[2,4,3],[0,2,-2]]

[0,0,0,0,0]

After applying operation [1,3,2]:

[0,2,2,2,0]

After applying operation [2,4,3]:

[0,2,5,5,3]

After applying operation [0,2,-2]:

[-2,0,3,5,3]

Coding:

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

a = [0]* n
for _ in range(k):
    SI, EI, inc= map(int, input().split())

    for i in range(SI, EI +1):
        a[i] += inc

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

Output:

	Input	Expected	Got	
✓	5 3 1 3 2 2 4 3 0 2 -2	-2 0 3 5 3	-2 0 3 5 3	✓

Passed all tests! ✓

9. Given a matrix mat where every row is sorted in **strictly increasing** order, return the **smallest common element** in all rows.

If there is no common element, return -1.

Example 1:

Input:

4 5

1 2 3 4 5

2 4 5 8 10

3 5 7 9 11

1 3 5 7 9

Output:

5

Constraints:

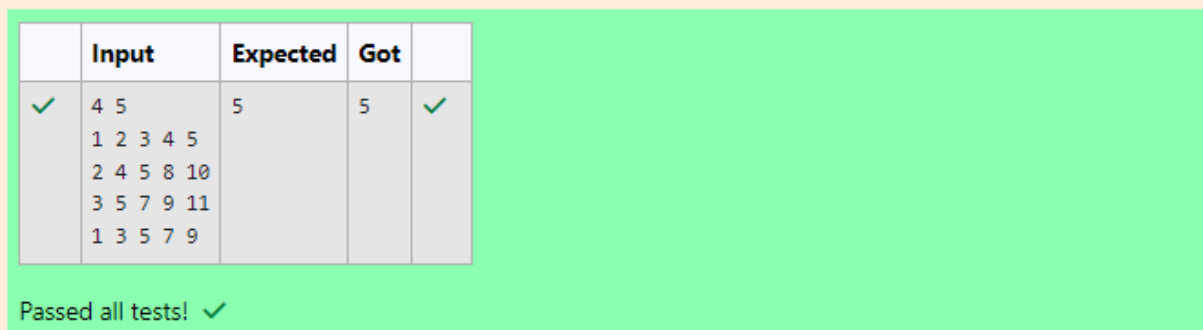
- 1 <= mat.length, mat[i].length <= 500
- 1 <= mat[i][j] <= 10^4
- mat[i] is sorted in strictly increasing order.

Coding:

```
import sys
from collections import Counter
f = input().strip()
n= int(f.strip()[0])

m=[]

for _ in range(n):
    r= list(map(int, input().split()))
    m.append(r)

counter=Counter()

for r in m:
    u = set(r)
    for e in u:
        counter[e] +=1

small = float('inf')
```

```
for e, count in counter.items():
    if count == n and e < small:
        small = e
if small == float('inf'):
    print(-1)
else:
    print(small)
```

Output:



	Input	Expected	Got	
✓	4 5 1 2 3 4 5 2 4 5 8 10 3 5 7 9 11 1 3 5 7 9	5	5	✓

Passed all tests! ✓

10. 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.

Example

n = 20

p = 3

The factors of 20 in ascending order are {1, 2, 4, 5, 10, 20}. Using 1-based indexing, if p = 3, then 4 is returned. If p > 6, 0 would be returned.

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^{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 = 1st factor of 1 is returned as the answer.

For example:

Input	Result
10 3	5
10 5	0
1 1	1

Coding:

```
def fa(n,p):
    f=[i for i in range(1,n+1) if n%i ==0]
    f.sort()


    if p <= len(f):
        return f[p-1]
    else:
        return 0

n = int(input())
p = int(input())
print(fa(n,p))
```

Output:

	Input	Expected	Got	
✓	10 3	5	5	✓
✓	10 5	0	0	✓
✓	1 1	1	1	✓

Passed all tests! ✓