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05 - List in Python

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**Ex. No. : 5.1 Date: 3.05.2024**

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## Count Frequency

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

def count\_frequency(arr): freq\_dict = {}

for num in arr:

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

else:

freq\_dict[num] = 1 return freq\_dict

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arr = []

for \_ in range(n): arr.append(int(input()))

frequency\_dict = count\_frequency(arr)

for key, value in frequency\_dict.items(): print(f"{key} occurs {value} times")

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

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**Ex. No. : 5.2 Date: 3.05.2024**

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## Non-duplicate elements

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

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**For example:**

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

n = int(input())

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

for num in arr: distinct\_elements.add(num)

print(" ".join(map(str, distinct\_elements)))

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

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**Ex. No. : 5.3 Date: 3.05.2024**

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## Merged array

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

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def merge\_arrays(arr1, arr2):

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

merged\_array = sorted(set1.union(se t2))

return merged\_array

def main(): try:

n1 = int(input()) arr1 =

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

n2 = int(input()) arr2 =

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

merged =merge\_arrays(arr1, arr2)

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#### print(end="")

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

#### except ValueError: print()

**if name == " main ": main()**

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

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**Ex. No. : 5.4 Date: 3.05.2024**

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# Sorted array

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 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

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def insert\_into\_sorted\_array(arr, n, item): arr.append(0)

i = n - 1

while i >= 0 and arr[i] > item: arr[i+1] = arr[i]

i -= 1

arr[i+1] = item return arr

n = 10

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

arr = insert\_into\_sorted\_array(arr, n, item) print(f"ITEM to be inserted:{item}") print("After insertion array is:")

for element in arr: print(element)

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

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**Ex. No. : 5.5 Date: 3.05.2024**

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# Deleting element in list

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

n = int(input())

List1 = list(map(int, input().split()))

def is\_strictly\_increasing(n, List1):

# Remove one element from the list and check if the remaining elements are strictly increasing for i in range(n):

new\_list = List1[:i] + List1[i+1:]

if is\_strictly\_increasing\_helper(new\_list): return True

# Check if the original list is strictly increasing return is\_strictly\_increasing\_helper(List1)

def is\_strictly\_increasing\_helper(List1): for i in range(len(List1) - 1):

if List1[i] >= List1[i+1]: return False

return True

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# Check if the list is strictly decreasing if List1 == sorted(List1, reverse=True):

print("True")

elif is\_strictly\_increasing(n, List1): print("True")

else:

print("False")

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

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**Ex. No. : 5.6 Date: 3.05.2024**

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# Repeated integers

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

def find\_pair\_with\_difference(arr, k): seen = set()

for i in range(len(arr)):

if (arr[i] - k) in seen or (arr[i] + k) in seen: return 1

seen.add(arr[i]) return 0

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

n = int(input())

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

result = find\_pair\_with\_difference(arr, k) .

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| --- | --- | --- | --- | --- |
|  | **Input** | **Expected** | **Got** |  |
|  | 1 | 1 | 1 |  |
| 3 |  |  |
| 1 |  |  |
| 3 |  |  |
| 5 |  |  |
| 4 |  |  |
|  | 1 | 0 | 0 |  |
| 3 |  |  |
| 1 |  |  |
| 3 |  |  |
| 5 |  |  |
| 99 |  |  |

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### Pivot element

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=5. The value of the last element is 5.
* Using zero based indexing, arr[3]=4 is the pivot between the two subarrays.
* The index of the pivot is 3. Constraints

· 3 ≤ n ≤ 105

· 1 ≤ arr[i] ≤ 2 × 104, where 0 ≤ I < n

* It is guaranteed that a solution always exists.

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

Each of the next n lines contains an integer, arr[i], where 0 ≤ I < n. Sample Case 0

Sample Input 0

4

1

2

3

3

Sample Output 0

2

ef find\_pivot(arr): n = len(arr)

total\_sum = sum(arr) left\_sum = 0

for I in range(n):

right\_sum = total\_sum – left\_sum – arr[i] if left\_sum == right\_sum:

return i left\_sum += arr[i]

return -1 # not found n = int(input())

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

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bpivot\_index = find\_pivot(arr)

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

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**Ex. No. : 5.8 Date: 3.05.2024**

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**Zip 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

def zip\_lists\_user\_input(): 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 = [a + b for a, b in zip(list1, list2)] return zipped\_list

zipped\_result = zip\_lists\_user\_input() print(zipped\_result)

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

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**Ex. No. : 5.9 Date: 3.05.2024**

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### Factors of a number

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

#### 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 ≤ n ≤ 1015

1 ≤ p ≤ 109

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

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

#### Sample Case 0

**Sample Input 0**

10

3

#### Sample Output 0

5

def find\_pth\_factor(n, p): factors = []

for i in range(1, n + 1): if n % i == 0:

factors.append(i) factors.sort()

if p <= len(factors): return factors[p - 1]

else:

return 0

def main(): try:

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

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pth\_factor = find\_pth\_factor(n, p)

print(pth\_factor) except

ValueError:

print()

if name == " main ":

main()

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Input** | **Expected** | **Got** |  |
|  | 10  3 | 5 | 5 |  |
|  | 10  5 | 0 | 0 |  |
|  | 1  1 | 1 | 1 |  |

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**Ex. No. : 5.10 Date: 3.05.2024**

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### Index Mapping

Given two lists A and B, and B is an anagram of A. B is an anagram of A means B is made by randomizing the order of the elements in A.

We want to find an *index mapping* P, from A to B. A mapping P[i] = j means the ith element in A appears in B at index j.

These lists A and B may contain duplicates. If there are multiple answers, output any of them. For example, given

#### Input

5

12 28 46 32 50

50 12 32 46 28

#### Output

1 4 3 2 0

def find\_mapping(A, B): mapping = {}

for i, num in enumerate(B): mapping[num] = i

return [mapping[num] for num in A]

if name == " main ": n

= int(input())

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

B = list(map(int, input().split())) mapping = find\_mapping(A, B) print(\*mapping)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Expected** | **Got** |  |  |
|  | 5  12 28 46 32 50  50 12 32 46 28 | 1 4 3 2 0 | 1 4 3 2 0 |  |

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