VELAMMAL ENGINEERING COLLEGE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION

CODING TEST I

1. You are given an array with N elements. Your job is to do the following:

    1. If the input is "A" or "a", followed by a value, append value at the end of the array.
    2. If the input is "S" or "s" followed by a number, both separated by blank space between them, then search for that element in the array. If present print the last occurrence of the number and if it is not present print "Not Available"
    3. If the input is "D" or "d" followed by a number, both separated by blank space between them, then delete all the occurrence of that value in the array.

Input format:

- The first line will contain the value of N (the length of the array).
- The second line will contain N space separated values that represent the elements of the array.
- The third line will contain the number of queries (T).
- Then T lines follow each containing one query each.

Output format:

Print the array after every query is executed. So you need to print T lines of output.

Sample Testcase 1:

> **Sample Input:**
> > 5
> > 1 2 3 4 5
> > 3
> > A 6
> > S 3
> > D 4

> **Sample Output:**
> > 1 2 3 4 5 6
> > 2
> > 1 2 3 5 6

Sample Testcase 2:

> **Sample Input:**
> > 5
> > 1 2 3 3 3
> > 3
> > A 6
> > S 3
> > D 3
> **Sample Output:**
> > 1 2 3 3 3 6
> > 4
> > 1 2 6

2. You are given an array with N elements. Your job is to reverse the array and print the reversed array.

Input format:

- The first line will contain the value of N (the length of the array).
- The second line will contain N space separated values that represent the elements of the array.

Output format:

Print the reversed array.

Sample Testcase 1:

> **Sample Input:**
> > 5
> > 1 2 3 4 5
>
> **Sample Output:**
> > 5 4 3 2 1

Sample Testcase 2:

> **Sample Input:**
> > 5
> > 1 2 3 3 3
>
> **Sample Output:**
> > 3 3 3 2 1

3. You are given an array with N elements. Print the "HEADs" of the array. An element is the "HEAD" if it is greater than all the elements to its right side. And the rightmost element is always a leader.

Input format:

- The first line will contain the value of N (the length of the array).
- The second line will contain N space separated values that represent the elements of the array.

Output format:

Print the "HEADs" of the array.

Sample Testcase 1:

> **Sample Input:**
> > 6
> > 16 17 4 3 5 2
>
> **Sample Output:**
> > 17 5 2

4. You are given an array with N elements and a number x. You need to determine whether or not there exist two elements in the array whose sum is exactly x.

Input format:

- The first line will contain the value of N (the length of the array).
- The second line will contain N space separated values that represent the elements of the array.
- The third line will contain the number x.

Output format:

Print "YES" if possible, else print "NO"

Sample Testcase 1:

    Sample Input:
        6
        1 4 45 6 10 -8
        16

    Sample Output:
        YES

5. You are given an array with N elements. You need to determine whether or not there exist a "frequent element" in the array. A "frequent element" is one that occurs in the array more than N/2 times.

Input format:

- The first line will contain the value of N (the length of the array).
- The second line will contain N space separated values that represent the elements of the array.

Output format:

Print the "frequent element" if available, else print "NO".

Sample Testcase 1:

    Sample Input:
        9
        3 3 4 2 4 4 2 4 4

    Sample Output:
        4

Sample Testcase 2:

    Sample Input:
        8
        3 3 4 2 4 4 2 4

    Sample Output:
        NO

6. You are given an array with N elements. Inversion Count for an array indicates – how far (or close) the array is from being sorted. If array is already sorted then inversion count is 0. If array is sorted in reverse order that inversion count is the maximum.

Formally speaking, two elements a[i] and a[j] form an inversion if a[i] > a[j] and i < j. You task is to calculate the number of such inversions.

Input format:

- The first line will contain the value of N (the length of the array).
- The second line will contain N space separated values that represent the elements of the array.

Output format:

Print the number of inversions.

Sample Testcase 1:

Sample Input:
4
8 4 2 1

Sample Output:
6

Reason: (8,4), (4,2),(8,2), (8,1), (4,1), (2,1) are the possible pairs of inversion.

Sample Testcase 2:

Sample Input:
3
3 1 2

Sample Output:
2

Reason: (3, 1), (3, 2) are the possible pairs of inversion.

7. You are given an array with N elements (all are positive). Find the maximum sum of a subsequence with the constraint that no 2 numbers in the sequence should be adjacent in the array. So 3 2 7 10 should return 13 (sum of 3 and 10) or 3 2 5 10 7 should return 15 (sum of 3, 5 and 7). Find the most efficient solution.

Input format:

- The first line will contain the value of N (the length of the array).
- The second line will contain N space separated values that represent the elements of the array.

Output format:

Print the maximum sum with the constraint imposed above.

Sample Testcase 1:

> **Sample Input:**
> > 6
> > 5 5 10 100 10 5
>
> **Sample Output:**
> > 110
>
> Reason: 5+100+5=110

Sample Testcase 2:

> **Sample Input:**
> > 3
> > 3 20 1
>
> **Sample Output:**
> > 20
>
> Reason: max sum is 20

8. You are given an array with N elements and a number x. You need to rotate the array to the right by x unit.

Input format:

- The first line will contain the value of N (the length of the array).
- The second line will contain N space separated values that represent the elements of the array.
- The third line will contain the number x.

Output format:

Print the rotated array.

Sample Testcase 1:

> **Sample Input:**
> > 6
> > 1 4 45 6 10 -8
> > 3
>
> **Sample Output:**
> > 6 10 -8 1 4 45

9. An element in a sorted array can be found in O(log n) time via binary search. But suppose we rotate an ascending order sorted array at some pivot unknown to you beforehand. So for instance, 1 2 3 4 5 might become 3 4 5 1 2. Devise a way to find an element in the rotated array in O(log n) time.

Input format:

- The first line will contain the value of N (the length of the array).
- The second line will contain N space separated values that represent the elements of the array.
- The third line will contain the number x the key (pivot value).

Output format:

Print the rotated array.

Sample Testcase 1:

> **Sample Input:**
> > 9
> > 5 6 7 8 9 10 1 2 3
> > 3
>
> **Sample Output:**
> > 8

10. You are given an array of n-1 integers and these integers are in the range of 1 to n. There are no duplicates in the list. One of the integers is missing in the list. Your task is to write a program to find this missing number.

Input format:

- The first line will contain the value of N (the length of the array).
- The second line will contain N space separated values that represent the elements of the array.

Output format:

Print the missing number.

Sample Testcase 1:

> **Sample Input:**
> > 9
> > 5 6 7 8 9 10 1 2 3
>
> **Sample Output:**
> > 4