

## #Problem 1: Upper and Lower Bound

### Description:

Given a sorted array A of size N and a search value S, you have to find the upper and lower bound value for S.

In the first line, you will be given N and S. In the second line, you will be given N values denoting the sorted array.

You have to print the upper and lower bound respectively with a single blank space. Keep a new line character after each output. Print the answer using 0 based indexing.

**Upper Bound:** The index of the smallest value in the sorted array which is greater than S. For repeating such values consider the largest or the right-most index. If the largest value in the array is smaller than S. Then the upper bound is the size of the array.

**Lower Bound:** The index of the largest value in the sorted array which is smaller or equal to S. For repeating such values consider the smallest or the left-most index. If S is smaller than the smallest value in the array, consider the lower bound as 0.

### Limits:

$1 \leq |A| \leq 100000$

### Test Cases:

Input	Output
5 3 1 2 3 7 8	3 2
5 4 1 2 3 7 8	3 2
8 6 1 3 5 5 5 7 9 10	5 2
8 12 1 3 5 5 5 7 9 10	8 7
8 0 1 3 5 5 5 7 9 10	0 0
6 3 1 2 2 4 4 7	4 1
6 2 1 2 2 4 4 7	4 1

- First solve for non repeating elements
- Then consider the solution for repeating elements
- Try to write code using separate functions

## #Problem 2: Height of the students

### Description:

You will be dealing with the heights of the students here. First, you will be given an integer value  $N$  denoting the number of students in the class. Then you will be given  $N$  numbers (can be floating point numbers) denoting the *height* of each student in some unit. The  $i^{\text{th}}$  number will denote the *height* of the  $i^{\text{th}}$  student. After that you will be given a value  $K$ .

In the assembly students are arranged from the smallest to largest height. You have to print the roll which will be standing in the  $K^{\text{th}}$  position in such an arrangement. The rolls follow 1 based indexing. In the case of repeating heights, you need to print the student with a lesser roll.

### Limits:

$1 \leq N \leq 100000$

$1 \leq k \leq 100000$

$100 \leq \text{height} \leq 5000$

### Test Cases:

Input	Output
5 100 105.3 500.7 200.3 161 3	5
4 205.1 181.2 173.7 181.2 2	2

## #Problem 3: Min Distance between the points of 1D coordinates

### Description:

You will be given  $N$ , 1D coordinates lying in the number line. You have to print the absolute minimum distance found between two given coordinates.

### Limits:

$1 \leq N \leq 100000$

### Test Cases:

Input	Output
5 7 10 9 -5 5	1
5 10 -15 15 12 3	2

#### #Problem 4: Finding Majority Element - 1

##### Description:

In this problem, you will be given N numbers. You need to find the element which occurred maximum number of times. If there are ties in frequencies, return the element which is comparatively greater.

In the first line, you will be given an integer N. In the following line, you will be given N integer values  $A_i$  ( $1 \leq i \leq N$ ).

For each input there will be a single line of output. Printing the element with the maximum number of occurrences. For ties in occurrences, print the element with the maximum value.

##### Limits:

$1 \leq N \leq 100000$ ,  $-10^5 \leq A_i \leq 10^5$

##### Test Cases:

Input	Output
6 5 3 2 3 2 1	3
7 5 1 2 3 3 2 2	2