Element Search - Rotated Sorted Array

A right circular rotation of an array $A[0 \cdots n-1]$ is shifting of ith element to $(i+1) \ mod \ (n-1)$ position.

A rotated sorted array is a sorted array with distinct elements which is right circular shifted multiple times. For instance array $\{3, 4, 5, 0, 1, 2\}$ is right circular shift of $\{0, 1, 2, 3, 4, 5\}$ by 3 times.

Given a rotated sorted array and a target element. Write a program to return the index of the target element in the given array. Return -1 if the target element is not found to be in the array.

Input Format

First line of each input is a positive integer t - number of test cases.

Each test case contains 3 lines

- n - the size of the array.

- n space seperated integers of input array.

- k - target element

Constraints

- $1 \leq t \leq 10$

- $1 \leq n \leq 10^6$

- $1 \leq a_i \leq 10^{15}$

Output Format

For each Output the index of k in new line. Return -1 if the element is not found in the array.

Sample Input 0

```
2
7
4  5  6  7  0  1  2
6
7
8  9  10  0  2  5  6
0
```

Sample Output 0

```
2
3
```

Explanation 0

Indexing of elements starts with 0. Hence, the index of target element 6 is 2 and that of 0 is 3.