

Assignment

Q1. Rotation Game

Problem Description

Given an integer array **A** of size **N** and an integer **B**, you have to print the same array after rotating it **B** times towards the right.

Problem Constraints

$1 \leq N \leq 10^6$

$1 \leq A[i] \leq 10^8$

$1 \leq B \leq 10^9$

Input Format

There are 2 lines in the input

Line 1: The first number is the size **N** of the array **A**. Then **N** numbers follow which indicate the elements in the array **A**.

Line 2: A single integer **B**.

Output Format

Print array **A** after rotating it **B** times towards the right.

Example Input

```
Input 1 :  
4 1 2 3 4  
2
```

Example Output

```
Output 1 :  
3 4 1 2
```

Example Explanation

Example 1 :

N = 4, **A** = [1, 2, 3, 4] and **B** = 2.

Rotate towards the right 2 times - [1, 2, 3, 4] => [4, 1, 2, 3] => [3, 4, 1, 2]
Final array = [3, 4, 1, 2]

Q2. Good Pair

Problem Description

Given an array **A** and an integer **B**. A **pair(i, j)** in the array is a good pair if $i \neq j$ and $(A[i] + A[j] == B)$. Check if any good pair exist or not.

Problem Constraints

$1 \leq A.size() \leq 10^4$

$1 \leq A[i] \leq 10^9$

$1 \leq B \leq 10^9$

Input Format

First argument is an integer array A.

Second argument is an integer B.

Output Format

Return 1 if good pair exist otherwise return 0.

Example Input

Input 1:

A = [1, 2, 3, 4]

B = 7

Input 2:

A = [1, 2, 4]

B = 4

Input 3:

A = [1, 2, 2]

B = 4

Example Output

Output 1:

1

Output 2:

0

Output 3:

1

Example Explanation

Explanation 1:

$(i, j) = (3, 4)$

Explanation 2:

No pair has sum equal to 4.

Explanation 3:

$(i, j) = (2, 3)$

Q3. Max and Min of an Array

Problem Description

Take input an array **A** of size **N** and write a program to print maximum and minimum elements of the input. The only line of the input would contain a single integer **N** that represents the length of the array followed by the **N** elements of the input array **A**.

Problem constraints

$1 \leq N \leq 1000$

$1 \leq A \leq 1000$

Input Format

The first line contains a single integer **N** representing the length of the array **A** followed by **N** elements of the array **A**.

Output Format

A single line output containing two space-separated integers. The first integer is the maximum value of the array. The second integer is the minimum value of the array.

Example Input

```
Input 1:
5 1 2 3 4 5
Input 2:
4 10 50 40 80
```

Example Output

```
Output 1:
5 1
Output 2:
80 10
```

Note: There is **no space** after the minimum value in the output format. There is only a **single space** between the maximum and minimum value.

Write a program to print maximum and minimum elements of the input.

Q4. Reverse the Array

Problem Description

You are given a constant array **A**.

You are required to return another array which is the reversed form of the input array.

Problem Constraints

$1 \leq A.size() \leq 10000$

$1 \leq A[i] \leq 10000$

Input Format

First argument is a constant array **A**.

Output Format

Return an integer array.

Example Input

Input 1:

```
A = [1,2,3,2,1]
```

Input 2:

```
A = [1,1,10]
```

Example Output

Output 1:

```
[1,2,3,2,1]
```

Output 2:

```
[10,1,1]
```

Example Explanation

Explanation 1:

Reversed form of input array is same as original array

Explanation 2:

Clearly, Reverse of [1,1,10] is [10,1,1]

Q5. Search Element

Problem Description

You are given an integer **T** (number of test cases). You are given array **A** and an integer **B** for each test case. You have to tell whether **B** is present in array **A** or not.

Problem Constraints

```
1 <= T <= 10
1 <= A <= 105
1 <= A[i], B <= 109
```

Input Format

First line of the input contains number of test cases as single integer **T** .

Next, each of the test case consists of 3 lines:

First line contains a single integer **A** denoting the length of array

Second line contains **A** integers denoting the array elements

Third line contains a single integer **B**

Output Format

For each test case, print on a separate line 1 if the element exists, else print 0.

Example Input

Input 1:

```
1
5
4 1 5 9 1
5
```

Input 2:

```
1
3
7 7 2
1
```

Example Output

Output 1:

```
1
```

Output 2:

```
0
```

Example Explanation

Explanation 1:

B = 5 is present at position 3 in **A**

Explanation 2:

B = 1 is not present in **A**.

Homework

Q1. Little Ponny and Maximum Element

Problem Description

Little Ponny is given an array, **A**, of **N** integers. In a particular operation, he can set any element of the array equal to **-1**.

He wants your help in finding out the minimum number of operations required such that the maximum element of the resulting array is **B**. If it is not possible, then return **-1**.

Problem Constraints

$1 \leq |A| \leq 10^5$

$1 \leq A[i] \leq 10^9$

Input Format

The first argument of input contains an integer array, **A**.

The second argument of input contains an integer, **B**.

Output Format

Return an integer representing the answer.

Example Input

Input 1:

A = [2, 4, 3, 1, 5]

B = 3

Input 2:

```
A = [1, 4, 2]
B = 3
```

Example Output

Output 1:

```
2
```

Output 2:

```
-1
```

Example Explanation

Explanation 1:

```
We need to remove 4 and 5 to make 3 the biggest element.
```

Explanation 2:

```
As 3 doesn't exist in the array, the answer is -1.
```

Q2. Second Largest

Problem Description

You are given an integer array **A**. You have to find the second largest element/value in the array or report that no such element exists.

Problem Constraints

$$1 \leq |A| \leq 10^5$$
$$0 \leq A[i] \leq 10^9$$

Input Format

The first argument is an integer array **A**.

Output Format

Return the second largest element. If no such element exist then return -1.

Example Input

Input 1:

```
A = [2, 1, 2]
```

Input 2:

```
A = [2]
```

Example Output

Output 1:

```
1
```

Output 2:

```
-1
```

Example Explanation

Explanation 1:

```
First largest element = 2  
Second largest element = 1
```

Explanation 2:

```
There is no second largest element in the array.
```

Q3. MINIMUM PICKS

Problem Description

You are given an array of integers **A** of size **N**.

Return the difference between the maximum among all even numbers of **A** and the minimum among all odd numbers in **A**.

Problem Constraints

$2 \leq N \leq 1e5$

$-1e9 \leq A[i] \leq 1e9$

There is atleast 1 odd and 1 even number in A

Input Format

The first argument given is the integer array, A.

Output Format

Return maximum among all even numbers of A - minimum among all odd numbers in A.

Example Input

Input 1:

```
A = [0, 2, 9]
```

Input 2:

```
A = [5, 17, 100, 1]
```

Example Output

Output 1:

```
-7
```

Output 2:

```
99
```

Example Explanation

Explanation 1:

```
Maximum of all even numbers = 2
```

```
Minimum of all odd numbers = 9
```

```
ans = 2 - 9 = -7
```

Explanation 2:

```
Maximum of all even numbers = 100
```

```
Minimum of all odd numbers = 1  
ans = 100 - 1 = 99
```

Q4. Separate Odd Even

Problem Description

You are given an integer **T** denoting the number of test cases. For each test case, you are given an integer array **A**.

You have to print the odd and even elements of array **A** in 2 separate lines.

NOTE: Array elements should have the same relative order as in **A**.

Problem Constraints

$$1 \leq T \leq 10$$

$$1 \leq |A| \leq 10^5$$

$$1 \leq A[i] \leq 10^9$$

Input Format

First line of the input contains a single integer **T**.

For each test case:

- First line consists of a single integer **|A|** denoting the length of array.
- Second line consists of **|A|** space separated integers denoting the elements of array **A**.

Output Format

For each test case:

- First line should contain an array of space separated integers containing all the odd elements of array **A**
- Second line should contain an array of space separated integers containing all the even elements of array **A**

Example Input

Input 1:

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

Input 2:

```
2
3
2 2 2
2
1 1
```

Example Output

Output 1:

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

Output 2:

```
2 2 2
1 1
```

Example Explanation

Explanation 1:

Test Case 1:
Odd elements in the array(in the order they occur) are: 1, 3, 5.
Even elements in the array(in the order they occur) are: 2, 4.

Test Case 2

Odd elements in the array(in the order they occur) are: 3.
Even elements in the array(in the order they occur) are: 4, 2.

Explanation 2:

Test Case 1:

There are no odd elements in the array.
Even elements in the array(in the order they occur) are: 2, 2, 2.

Test Case 2

Odd elements in the array(in the order they occur) are: 1, 1.
There are no even elements in the array.

Q5. Multiple left rotations of the array

Problem Description

Given an array of integers **A** and multiple values in **B**, which represents the number of times array A needs to be left rotated.

Find the rotated array for each value and return the result in the form of a matrix where i^{th} row represents the rotated array for the i^{th} value in B.

Problem Constraints

$1 \leq \text{length of both arrays} \leq 2000$ $-10^9 \leq A[i] \leq 10^9$ $0 \leq B[i] \leq 2000$

Input Format

The first argument given is the integer array **A**.
The second argument given is the integer array **B**.

Output Format

Return the resultant matrix.

Example Input

Input 1:

```
A = [1, 2, 3, 4, 5]
B = [2, 3]
```

Input 2:

```
A = [5, 17, 100, 11]
B = [1]
```

Example Output

Output 1:

```
[ [3, 4, 5, 1, 2]
  [4, 5, 1, 2, 3] ]
```

Output 2:

```
[ [17, 100, 11, 5] ]
```

Example Explanation

for input 1 -> B[0] = 2 which requires 2 times left rotations

1: [2, 3, 4, 5, 1]

2: [3, 4, 5, 1, 2]

B[1] = 3 which requires 3 times left rotation

1: [2, 3, 4, 5, 1]

2: [3, 4, 5, 1, 2]

```
2: [4, 5, 1, 2, 4]
```

Q6. Leaders in an array

Problem Description

Given an integer array **A** containing **N** distinct integers, you have to find all the **leaders** in array **A**. An element is a leader if it is strictly greater than all the elements to its right side.

NOTE: The rightmost element is always a leader.

Problem Constraints

```
1 <= N <= 105
1 <= A[i] <= 109
```

Input Format

There is a single input argument which is an integer array A

Output Format

Return an integer array denoting all the ****leader elements**** of the array.

NOTE: Ordering in the output doesn't matter.

Example Input

```
A = [16, 17, 4, 3, 5, 2]
```

Example Output

```
[17, 2, 5]
```

Example Explanation

Element 17 is strictly greater than all the elements on the right side to it.

Element 2 is strictly greater than all the elements on the right side to it.

Element 5 is strictly greater than all the elements on the right side to it.

So we will return these three elements i.e [17, 2, 5], we can also return [2, 5, 17] or [5, 2, 17] or any other ordering.

Q7. Bulbs

Problem Description

A wire connects **N** light bulbs.

Each bulb has a switch associated with it; however, due to faulty wiring, a switch also changes the state of all the bulbs to the right of the current bulb.

Given an initial state of all bulbs, find the **minimum number** of switches you have to press to turn on all the bulbs.

You can press the same switch multiple times.

Note: **0** represents the bulb is off and **1** represents the bulb is on.

Problem Constraints

$0 \leq N \leq 5 \times 10^5$

$0 \leq A[i] \leq 1$

Input Format

The first and the only argument contains an integer array A, of size N.

Output Format

Return an integer representing the minimum number of switches required.

Example Input

Input 1:

A = [0, 1, 0, 1]

Input 2:

A = [1, 1, 1, 1]

Example Output

Output 1:

4

Output 2:

0

Example Explanation

Explanation 1:

```
press switch 0 : [1 0 1 0]
press switch 1 : [1 1 0 1]
press switch 2 : [1 1 1 0]
press switch 3 : [1 1 1 1]
```


Explanation 2:

There is no need to turn any switches as all the bulbs are already on.

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