

Find the group

You are given 2 arrays of size N and M. You have to answer Q queries where each query consists of a number.

You have to find out in which of the two arrays is the given number in.

Input

The first line gives the number of test cases T ($T \leq 10$).

Then T test case follow.

The first line of each test case gives the value of N. The second line contains N space separated integers.

The third line of each test case gives the value of M. The fourth line contains M space separated integers.

Next line gives the value of Q, number of queries to be answered.

Q lines follow containing a number each on one line.

Output

For each test case, in response to the Q queries for that test-case print Q lines.

If the number is present in both arrays, print "both" (without quotes).

Else print the array in which the number is in (1 or 2).

If the number is not present in both arrays, print -1.

Print a new line after every test case.

Example

Input:

```
2
3
5 8 2
4
3 8 6 1
4
5
8
6
9
3
1 2 3
3
1 2 3
3
1
2
3
```

Output:

```
1
both
2
-1
```

```
both
both
both
```

Constraints:

$N, M \leq 20000$

$Q \leq 30000$

All numbers in the input will be less than 50000.

Explanation:

For the first case, 5 is present in array 1 only, 8 is present in both arrays, 6 is present in array 2 only while 6 is not present in either array.