

6733 Sorted Queues

The Pandavas are coming back to Hastinapura after winning the war with the Kauravas. Yaaay!!! The people of Hastinapura want to welcome them with a long procession. They decide to stand in two parallel lines A and B of size N each. (In the days of our glorious past, Indians knew how to stand in orderly lines.) $A[i]$ is the height of i -th person in line A and $B[i]$ is the height of i -th person in line B.

The people want to arrange themselves in strictly increasing order of their heights so that they can all see the dignitaries on stage in front. To avoid the inevitable chaos if everyone started to move around, they are allowed to do only one kind of operation:

- pick an index i , and swap the i -th person from line A with the i -th person from line B (swap $A[i]$ and $B[i]$).

We won't ask you whether you yourself are well-behaved when standing in a line, but you should surely be able to determine

- whether they can perform swaps so that in the end, the people in A and B have their heights sorted in strictly increasing order.
- and if (a) is possible, the minimum number of steps to do it, with each swap being counted as a step.

Input

The first line contains T , the number of test cases. The description of T test cases follow.

The first line of each test cases contains integer N , the size of arrays A and B.

The next line contains N space separated integers, which represent the heights of people in line A.

The third line contains N space separated integers which represent the heights of people in line B.

Output

For each test print a single integer which is the minimum number of steps required to make both A and B sorted. Print '-1' if they cannot be put in sorted order.

Constraints:

$$1 \leq N \leq 10000$$

$$0 \leq A[i], B[i] \leq 10^9$$

Sample Input

```
3
4
1 4 4 9
2 3 5 10
3
1 2 3
3 2 1
4
2 1 6 5
0 3 4 7
```

Sample Output

1
-1
2