CS 124 Problem Set 4

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Due: Wednesday, March 11, 2015 11:59 pm EDT (**deadline passed**)

Problems

Zoo

image source

There are animals located along a straight west-east road at a zoo.

There are two entrances to the road. One is located at the far west end of the road, and the other is located at the far east end of the road.

Associated with each animal is a species descriptor, which is an integer that corresponds to a particular animal species. Species descriptors may be repeated among the animals at the zoo.

You are given a list of the animal exhibits at the zoo in west-east order. Every exhibit contains one animal. Your task is to determine the number of pairs of animal exhibit indices at the zoo (i, j) such that i < j and if you walked towards exhibit i from the western gate, and your friend walked towards exhibit j from the eastern gate, you would see more animals of exhibit i's type (on your west-east route) than your friend would see of exhibit j's type (on her east-west route).

CONSTRAINTS
For test cases worth a total of 0 points:
There is a single test case (test 1) that is worth 0 points.
The input is simply the example in the spec, below ("SAMPLE INPUT").
This test serves to verify that the server is assessing your code correctly, in the event that all of the other test cases are reported as Incorrect Output.

For test cases worth a total of 25 points:
$0 \le N \le 1000$
$0 \le$ species id #s ≤ 100

For test cases worth a total of 25 points:
0 ≤ N ≤ 1000
0 ≤ species id #s ≤ 1000000000

For test cases worth a total of 50 points:
0 ≤ N ≤ 50000
0 ≤ species id #s ≤ 1000000000

TIME LIMIT
100 ms per test cases in first and second group. (2x for Java, 10x for Python)
600 ms per test cases in third group.

INPUT FORMAT
First a line containing N (the number of animal exhibits).
Next a line containing s1 through sN, the species type descriptors of the
N animals.

OUTPUT FORMAT
A single integer, as specified above.

SAMPLE INPUT
5
2 2 4 1 2

SAMPLE OUTPUT
3

DETAILS
Assuming 1-based indexing, the pairs are (2, 3), (2, 4), (2, 5).
In the first pair, (2, 3), you'd see 2 animals of type "2"
while your friend will see 1 animal of type "4". In the second pair,
(2, 4), you'd see 2 animals of type "2" while your friend will see 1 animal
of type "1". Finally, in the pair (2, 5), you'd see 2 animals of type "2"
while your friend will see 1 animal of type "2".

Based on the "Ultra Cool Programming Contest Control Centre" v1.7b by Sonny Chan
Modified for CS 124 by Neal Wu, with design help from Martin Camacho