

Prof. Dr. Friedrich, Dr. Lenzner, Boockmeyer, Neumann, Stangl  
Sommersemester 2017

## Woche 12 – (Adv.) Competitive Programming

Abgabe 10.07.2017 17:00 Uhr, über das Judge-Interface

### Aufgabe 1 (presspicture2). (100 Points – 2 second timelimit)

You and the other HPI students just finished taking the HPI press picture. As a reminder, you were all given colored t-shirts, and were told to stand in a row, avoiding people with the same color standing next to each other.

For the next picture, the PR department has thought up a very special trick: Everyone is standing on a small footbridge over Lake HPI. You should be ordered by the lightness of the shirt color<sup>1</sup>.

Unfortunately, the photographer only tells you that after you have already marched on the footbridge. You don't want to walk off of the footbridge, so you have to reorder while on it. Because there is so little room, you cannot just walk to your position, but only carefully swap position with any of your neighbours. How often does this dangerous maneuver have to be performed before the students are ordered as desired?

**Input** The input starts with a line containing  $a$  ( $0 \leq a \leq 50$ ), the number of initial student arrangements for that you want to answer this question. Each arrangement starts with a line containing  $n$  ( $0 \leq n \leq 10^5$ ), the number of students. The following line contains the numbers  $l_0$  to  $l_{n-1}$  ( $0 \leq l_x \leq 10^5$ ) for  $0 \leq x < n$ , the lightness of the shirts worn by the students. For the photo, the person with the highest lightness value should be at position 0, and then ordered up to the one with the lowest value at position  $n - 1$ .

**Output** For each initial arrangement, write a line containing the number of times two students have to swap places<sup>2</sup>.

---

<sup>1</sup> Due to production problems shirts of the same color actually have some slight variation, so for this picture there are a lot more distinct colors to consider than for the last one.

<sup>2</sup>Note that this number might exceed the range of a 32 bit integer

**Points** There are three groups of test sets:

- *easy*: The first group of operations worth 20 points, you can assume that  $n \leq 100$ .
- *medium*: For the second group worth 20 Points, you can assume that  $n \leq 2000$ .
- *hard*: For the third group worth 60 Points, there are also no additional assumptions.

**Sample Input**

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

**Sample Output**

```
10
4
0
```