7514 Bridge

Žofka and her Dad started playing Bridge (the card game). As a result of this newfound hobby, the number of various card sets at their home has been dramatically increasing. However, with so many cards, disorder has crept into the house. Cards on the table, floor, shelves, ... Something had to be done — Žofka decided to organize the cards. She first collected all the cards and created a huge stack. As a first step, she wants to reorder the cards so that all the red cards come before all the black cards. But the task is boring, so her mind wanders off: if she were to swap only adjacent cards, what is the smallest number of swaps she needs to reorder the cards so that the red cards come before the black cards?

Input

The first line contains k, the number of card stacks. Each stack is described on two lines. The first line contains an integer $n > 0$. The second line describes the card stack: It contains n strings of the form '*value_suit*', where *value* is either a number from 2 to 10, or one of the letters '`J`', '`Q`', '`K`', '`A`', and *suit* is a single letter chosen from '`s`', '`h`', '`d`', '`c`' (these stand for spades, hearts, diamonds, and clubs — the hearts and diamonds are red, and the spades and clubs are black). The strings are separated by white space and describe the order of the cards on the stack from the topmost card to the bottommost card. You may assume that n is at most 100,000.

Output

The output contains k lines. The i-th line corresponds to the i-th card stack. It contains the smallest number of swaps of adjacent cards needed to reorder the stack so that, when going through the stack from the top to the bottom, all red cards come before all black cards.

Explanation:

For the first sample input, we need to swap the `A` of spades with the `K` of diamonds.

The second sample input is already ordered properly.

The third sample input needs 5 swaps, for example: the `10` of hearts with the `K` of clubs, then the `2` of hearts with the `K` of spades, then the `J` of diamonds with the `K` of clubs, then the `10` of hearts with the `K` of spades, and, finally, the `J` of diamonds with the `K` of spades.

Sample Input

```
3
3
2_h A_s K_d
4
2_h A_d K_s K_s
6
A_d K_s 2_h K_c 10_h J_d
```

Sample Output

```
1
0
5
```