

## 7029 Edit Distance Revisited

You are given  $N$  arrays of size  $K$  each, such that each array contains all numbers from 1 to  $K$ , and no two arrays are the same (two arrays are called same if for every index they have the same value).

*Edit distance* between two arrays  $A_1$  and  $A_2$  is denoted by  $E(A_1, A_2)$ , and is defined as the least number of steps needed to make the two arrays same if these 2 operations are allowed:

1. Delete any element from one of the arrays.
2. Insert any element at any position in one of the arrays.

You have to find an arrangement  $A$  such that:

1. Each element of  $A$  is one of the arrays in the input.
2. Each of the arrays in the input occur atleast once in  $A$ .
3.  $A$  first increases lexicographically then decreases. Formally, let  $X < Y$  mean that array  $X$  is lexicographically smaller than array  $Y$ . If size of arrangement  $A$  is  $L$ , then there exists an  $i$  ( $1 \leq i \leq L$ ) such that  $A_1 < A_2, A_2 < A_3, \dots, A_{i-1} < A_i$  and  $A_{i+1} < A_i, A_{i+2} < A_{i+1}, \dots, A_L < A_{L-1}$ .
4. Of all the arrangements satisfying above 3 properties,  $A$  has the least sum of edit distances of neighbouring elements. Formally,  $E(A_1, A_2) + E(A_2, A_3) + \dots + E(A_{L-1}, A_L)$  is smallest possible among all arrangements satisfying above 3 properties.

For such an arrangement, output the value  $E(A_1, A_2) + E(A_2, A_3) + \dots + E(A_{L-1}, A_L)$ .

### Input

First line contains  $T$ , the number of testcases. First line of each test case contains two integers  $N$  and  $K$ .

Each of the next  $N$  lines of each testcase contains  $K$  space separated integers.

### Output

Output one line per testcase containing the required answer.

### Constraints:

- $1 \leq T \leq 5$
- $1 \leq N \leq 1000$
- $1 \leq K \leq 100$

### Sample Input

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

**Sample Output**

6