Honor Coding

1 Problem Statement

Professor Nicolosi is preparing to give a final exam, but is concerned that, given the opportunity, his students will cheat. He decides on a few ground rules to prevent the students from cheating:

1. No student may sit adjacent (left/right) to another student.
2. No student may sit diagonally behind another student.

For example, if Prof. Nicolosi has 10 desks in 2 rows of 5, and he has 4 students to seat, they could be sat as follows:

	1		2	
	3		4	

GOOD

In an alternative arrangement, he is concerned that students 1 and 2 will copy each other's tests, and student 4 will cheat off of students 2 and 3.

1	2		3	
		4		

BAD

Unfortunately for the Professor, many of the classrooms have broken desks, so he can't seat students in these desks. Additionally, each desk is attached to the floor, so they cannot be moved. Given the same 2x5 classroom with three broken desks, a valid arrangement for the four students could then be as follows (X's are used to mark desks that are broken and cannot be used).

X	X	1		2
3		X		4

GOOD

Professor Nicolosi wants to determine the maximum number of students he can sit in a classroom such that there is no cheating. Given the classroom layout, find the maximum number of students that can be seated according to his rules.

2 Input

The first line of input contains a single integer $\boldsymbol{P}$, ($\mathbf{1} \leq \boldsymbol{P} \leq \mathbf{1000}$), which is the number of data sets that follow. Each data set should be processed identically and independently.

Each data set begins with a single line that contains $\boldsymbol{K}$, the data set number, followed by $\boldsymbol{R}$, ($\mathbf{1} \leq \boldsymbol{R} \leq \mathbf{1000}$) which is the number of rows of desks and $\boldsymbol{C}$, ($\mathbf{1} \leq \boldsymbol{C} \leq \mathbf{10}$) which is the number of columns of desks in the classroom. The desks are always arranged in a grid, so the total number of desks is exactly equal to $\boldsymbol{R} \times \boldsymbol{C}$, however this may include broken desks.

This is followed by $\boldsymbol{R}$ lines which describe the desks that are broken in each row. Each line is of the format ($\boldsymbol{n}$ a_1 a_2 ... a_n), where $\boldsymbol{n}$, ($\boldsymbol{0} \leq \boldsymbol{n} \leq \boldsymbol{C}$) is the number of broken desks in the row, and each a_i, ($\boldsymbol{0} \leq a_i < \boldsymbol{C}$) is the column of a desk that is broken in the row. If there are no broken desks in a row, the line will simply contain the number 0 (because $n = 0$).

3 Output

For each data set there is a single line of output. The single line of output consists of the data set number $\boldsymbol{K}$, followed by a single space followed by the maximum number of students that can be seated in the classroom under the Professor's constraints.

4 Test Data

Input	Output
3 1 2 5 2 1 3 2 1 3 2 2 5 2 0 1 1 2 3 3 5 1 3 1 1 2 2 3	1 6 2 4 3 8

For your convenience, the sample input classroom arrangements are listed below, where X is used to indicate a desk that is broken. The first desk of the first row is at the top left of each chart.

Data set #1

	X		X	
	X		X	

Data set #2

X	X			
		X		

Data set #3

			X	
	X			
		X	X	