

Problem M. November 11th

It's November 11th, which is Singles' Day! On this day, a certain cinema is only allowing singles to watch movies there. Couples are forbidden!

There are R rows in this cinema, numbered $0, 1, \dots, R - 1$. In each row, there are S seats, numbered $0, 1, \dots, S - 1$.

Singles refuse to sit directly beside each other. Two seats are considered beside each other if they are in the same row and they have consecutive seat numbers.

There are a total of B broken seats in the cinema, and nobody can sit in a broken seat.

The cinema owner has asked you to find two values:

- The maximum possible number of singles that could sit in this cinema
- The minimum number of singles needed to occupy the cinema so that no more singles can sit

Input

The first line of the input gives the number of test cases, T . T test cases follow.

Each test case starts with one empty line and then 2 integers R and S , the number of rows and the number of seats per row.

The next line consists of a number B . Then B lines follow; each has two 2 integers r_i and s_i , indicating that in row r_i , seat s_i is broken. All of the broken seats will be different.

Output

For each test case, output one line containing "Case #x: y z", where x is the test case number (starting from 1), y is the maximum possible number of singles that could sit in this cinema, and z is the minimum possible number of singles that could occupy the cinema.

Limits

- $1 \leq T \leq 100$.
- $1 \leq R, S \leq 1000$.
- $0 \leq B \leq 1000$.
- $0 \leq r_i \leq R - 1$.
- $0 \leq s_i \leq S - 1$.

Sample input and output

Sample Input	Sample Output
3	Case #1: 4 3
2 3	Case #2: 4 2
1	Case #3: 0 0
0 1	
2 3	
0	
1 1	
1	
0 0	

Note

In Case #1, up to four singles can fit in the cinema:

SBS
S.S

However, it is possible for three singles to occupy the cinema:

SBS
.S.