7512 November 11-th

It's November 11-th, 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, $\cdots$, $R-1$. In each row, there are S seats, numbered 0, 1, $\cdots$, $S-1$.

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:

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

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.
```

Sample Input

```
3

2 3
1
0 1

2 3
0

1 1
1
0 0
```

Sample Output

```
Case #1: 4 3
Case #2: 4 2
Case #3: 0 0
```