Connect 'Em

SEASON 10 – SECOND ROUND

Misho loves to connect squares – this is his favorite activity to tackle boredom. He has a sheet of paper divided into $\boldsymbol{N}$ rows and $\boldsymbol{M}$ columns, numbered respectively with the numbers from 1 to N and from 1 to M. In the beginning, he places his pencil in the centre of the square with coordinates $(1, 1)$. After that, he can move it to the centre of $(1, 2)$ or $(2, 1)$. Generally, if the tip of the pencil is now placed in the cell on the i-th row and the j-th column, Misho may move it to $(i, j + 1)$ or $(i + 1, j)$. His aim is to reach the square on the last row and the last column (this with coordinates (N, M)), without lifting the pencil.

Once when he was particularly bored in class, Misho began to connect squares. His teacher noticed that and got angry. In order not to punish him, she gave him a list of $\boldsymbol{K}$ different squares and asked him to connect the cells in such a way so that the pencil would cross each of them. Unfortunately, this is not always possible. Write a program which finds the maximal number of the given squares, which the pencil could cross, as well as how many different ways to do that exist. Two ways are considered different if one of them crosses given square, while the other does not. Your program has to process $\boldsymbol{T}$ test cases during a single execution.

Input

The first line of the input file `connectem.in` contains one number T. The descriptions of T test cases follow.

On the first line of the description of each test case are written three numbers N, M и K. On each of the following K lines are written two numbers R_i and C_i – the coordinates of the cells which the teacher has given. Among them always will be $(1, 1)$ and (N, M).

Output

For each test case on a single line of the output file `connectem.out` print two numbers, separated by a space – the maximal number of squares which could be crossed and the number of ways to achieve that.

Constraints

$1 < N, M \leq 100\,000$
$1 < K \leq 5\,000$
$1 \leq R_i \leq N$
$1 \leq C_i \leq M$
The sum of the values of K over all test cases will not exceed 5 000.

Example

Input	Output
1 4 5 5 1 1 1 2 2 4 4 3 4 5	4 13