Jolly Kingdom

Jolly Kingdom is a kingdom which is famous for its troops' power. Jolly Kingdom has N swordsman troops and M archer troops where each troop has his/her own unique fighting style, different with others.

For the 10^{th} times, an evil witch with her monster troops tries to seize the throne of Jolly Kingdom. According to the information gathered from Jolly Kingdom's spies, the witch will attack everyday for H days. Each day, the witch will add 1 new monster into her monster troops. This makes enemy's troops become stronger every day.

Each monster owned by the witch is strong and almost unbeatable, only the X_i^{th} swordsman troop or the Y_i^{th} archer troop can beat the monster. After the monster has been defeated by Jolly Kingdom's troop, that monster will take a reset and attack again in the next day.

To protect Jolly Kingdom, every day **all monsters** have to be defeated, but the cost to send 1 troop is expensive, so the king wants to send minimum number of troops every day such that the sent troops will be able to defeat **all monsters** exist on that corresponding day.

The king asks you for your help, as a royal advisor, the number of troops the king has to send every day.

Input

First line consists of 3 integers: N, M, and H ($1 \le N, M \le 1000$; $1 \le H \le N*M$) – the number of swordsman troops, archer troops, and days. Each of next H lines contains 2 integers: X_i and Y_i ($1 \le X_i \le N$; $1 \le Y_i \le M$) – the weakness of i^{th} monster, i^{th} can be defeated by the X_i^{th} swordsman or Y_i^{th} archer.

There can't be 2 monsters with the exact same weakness (there won't be any monster i and j where $X_i = X_j$ and $Y_i = Y_j$ for all $1 \le i, j \le H$ and $i \ne j$).

Output

Print H lines. Each line contains 1 number represents the answer to the king's question.

Sample Tests

Input
4 4 9 1 1 1 2 1 3 2 1

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

Output

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

Explanation for sample case

Notation: { swordsman troop number: monster number(s) defeated } { archer troop number: monster number(s) defeated }
1st day: {**1**: 1} {}
2nd day: {**1**: 1 2} {}
3rd day: {**1**: 1 2 3} {}
4th day: {**1**: 1 2 3} {**1**: 4}
5th day: {**1**: 1 2 3} {**1**: 4 5}
6th day: {**1**: 1 2 3; **3**: 6} {**1**: 4 5}
7th day: {**1**: 1 2 3; **3**: 6 7} {**1**: 4 5}
8th day: {**1**: 1 2 3; **3**: 6 7; **4**: 8} {**1**: 4 5}
9th day: {**1**: 1 2 3; **3**: 6 7; **4**: 8 9} {**1**: 4 5}

Information

- The constraints above is not typo, N and M can be as large as 1000 (1 Thousand), so H can be as large as 10^6 (1 Million). So this problem has 10× larger constraints than the original one.
- Warning: Large Input/Output files, each file I/O can be as large as 7.5 Megabytes (7.5 MB), cin or cout probably too slow for I/O, it's recommended to use scanf/printf (I've tested it).
- If you find this problem too hard, you can try this first: https://jollybeeoj.com/problem/view/199 original problem with smaller constraints.

Trivia

- The total size of file I/O in this problem is slightly more than 100 MB, took a while to generate, modify, and upload it. :)
- If the witch attack Jolly Kingdom everyday for 1 Million days that means the attack took more than 2500 years. :o
- If I count number of operation in the deepest loop of my algo on worst case input, it will be

671,163,499 operations.

Credit & Special thanks

- Sandy Karunia - Developer of Jollybee Online Judge
- Alvin Setiadi - Original problem author