

7000 Present Problem

A group of persons (indexed from 0 to $n - 1$) play a game to determine which of the n presents (also indexed from 0 to $n - 1$) each of them will get. They play the game on a system of n vertical “lines”, numbered from 0 to $n - 1$, from left to right. Person i initially is at the top of line i , and present i is at the bottom of line i . All lines have length l . There are also horizontal “links” that connect two adjacent lines i and $i + 1$ at the same length k , where k is an integer distance from the top end of the line, and $0 < k < l$. We use link (i, k) to denote this link. In addition, two links adjacent to a line cannot be at the same length of the line. That is, we cannot have both links (i, k) and $(i + 1, k)$.

Person i determines which present he will receive as follows. He will start from the top of line i and go downward. Whenever he encounters an intersection of a line and a link, he has to make a turn, and he can go either left or right along a link, or downward along a line. Finally he will reach the bottom of a line j , and he will receive present j .

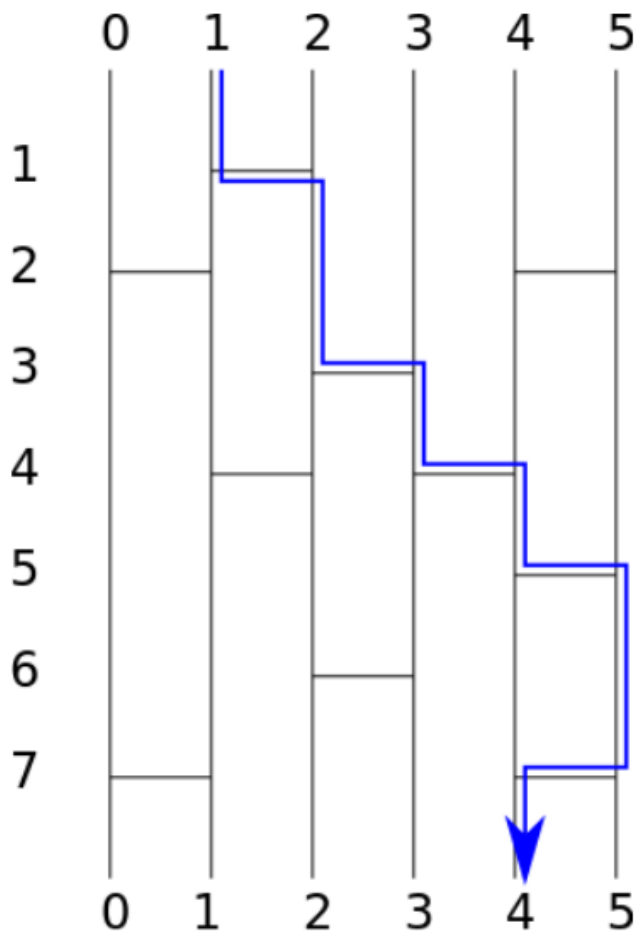


Figure 1: An example of 6 lines and 10 links.

We use Figure 1 to illustrate the rules. Person 1 starts from the top of line 1 and goes downward. He first reaches the link at $(1, 1)$ and makes a turn to line 2, and keeps going downward. Then he reaches the link at $(2, 3)$ and makes another turn to line 3. He keeps on going, as indicated by the path in Figure 1, and finally reaches present 4.

Your task is to determine for all persons, what presents do they receive, and list the present indices from person 0 to person $n - 1$. In the previous example you should output 3, 4, 1, 0, 5, 2, because person 0 will get present 3, person 1 will get present 4, and so on.

Technical Specification

1. $1 \leq n \leq 10,000$, where n is the number of lines.
2. $1 \leq m \leq 100,000$, where m is the number of links.
3. $1 \leq l \leq 10,000$, where l is the length of the lines.

Input

The first line of the input has the number of test cases c . For each test case, the first line has n , m , and l , indicating the number of lines, the number of links, and the length of the lines respectively. Each of the next m lines contains two integers i and k , to indicate a link at (i, k) .

Output

For each test case, your should output n lines, where the i -line is the present id person i will receive.

Sample Input

```
1
6 10 8
0 2
2 6
0 7
1 1
4 2
4 5
1 4
2 3
3 4
4 7
```

Sample Output

```
3
4
1
0
5
2
```