

Virus

Problem code : GM

Time Limit : 1 second

Memory Limit : 256 MB

Problem Statement: One day Gayank Moel was high and started acting weirdly. Nothing new here. He thought of an evil plan in which he decided to inject a virus into some of his friends so that they also become like him. Then each infected person also starts infecting his friends. Eventually the virus got spread to his entire batch of Gayank Moels to deal with.(THE HORROR!)

You are given a matrix of size $n*m$ where each cell represents one student. You are given students that are injected with virus at time $t=0$. In one second each student can inject virus to students in cells adjacent to it that is exactly 1 step up,down,right and left as long as it is in the matrix. Now for each student(cell) we need to tell the first instance of time when he got infected by the virus.

Input

The first line of the input contains two integers n and m — the dimensions of the matrix.

The next line in the input contains an integer k , Number of students infected at $t=0$.

Then each of next k lines contains two integers r,c which is the index of cell infected.(each cell may occur multiple times)

Output

Print a matrix of size $n*m$ where each cell has value equal to the first instance of time when virus reached the student present in that cell.

Constraints

- for *subtask1* :
 $1 \leq n * m \leq 10^3$
 $1 \leq k \leq n * m$
 $1 \leq r \leq n$
 $1 \leq c \leq m$
- for *subtask2* :
 $1 \leq n * m \leq 4 * 10^5$
 $1 \leq k \leq n * m$
 $1 \leq r \leq n$
 $1 \leq c \leq m$

Sample Test Case

Input	Output
3 3	0 1 2
2	1 2 1
1 1	2 1 0
3 3	

Input	Output
2 3	0 0 1
2	1 1 2
1 1	
1 2	