E. Escape the Common Room (Escape)

Problem Statement

The CSIE(Computer Science and Informatic Engineering) common room of National Okapi University is a strange place. There's a lounge for each year (freshman, sophomore, etc.), a Mahjong room, a study hall and more, but there also resides a monster called the Three-mouthed Sheep.

Three-mouthed sheep is a terrifying creature that likes to (physically) merge with freshmen. When an unsuspecting target is spotted, it will start approching them, and they will definitely get merged by this monster once they run into each other.

Recently something unimaginable happened, the Three-mouthed Sheep started multiplying! More and more Three-mouthed sheep started to appear out of nowhere, with the sole purpose of traumatizing freshmen for the rest of their life! **8e7**, an innocent freshman, wants to avoid being merged by the Three-mouthed sheep.

Formally, the common room is a $C \times C$ grid in an infinite plane, there are N three-mouthed sheep which will appear in order, the i-th of which will appear at integer coordinates (x_i, y_i). It is guaranteed that $0 \leq x_i, y_i \leq C$. Initially **8e7** starts at integer coordinates (x, y) in the $C \times C$ grid, and all of the three-mouthed sheep will notice **8e7** and try to merge with him. He is considered merged if at any point in time his position coincides with any of the three-mouthed sheep (including the initial position). In each move, **8e7** can move one unit along the grid (facing up, down, left, or right) or stay still, then all of the three-mouthed sheep will also move one unit along the grid or stay still. Each three-mouthed sheep moves independently, and they can move optimally as a group to catch **8e7**.

A starting position (x, y) is considered safe if **8e7** can escape the $C \times C$ area after some moves, and dangerous otherwise.

For each i, **8e7** wants to know how many dangerous starting positions there are after the first i three-mouthed sheep appear.

Please write a program to help **8e7** out (He really needs it).

Input Format

n C
x_1 y_1
x_2 y_2
$\vdots$
x_n y_n

- n denotes the number of three-mouthed sheep.
- C denotes the side length of the common room.
- x_i, y_i denotes the starting position of the i-th three-mouthed sheep.

Output Format

ans_1
ans_2
$\vdots$
ans_n

- ans_i denotes the numder of dangerous starting position after the first i three-mouthed sheep appear.

Constraints

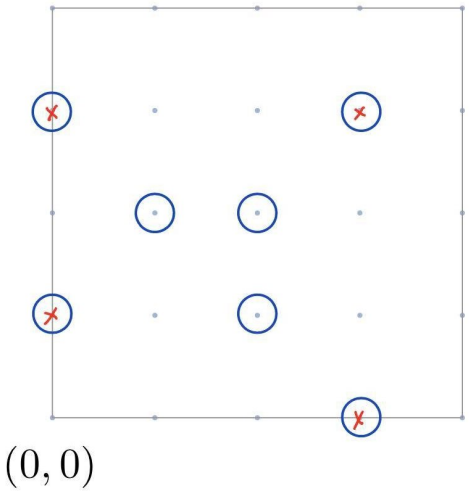
- $1 \leq N, C \leq 2 \times 10^5$
- $0 \leq x_i, y_i \leq C, \forall 1 \leq i \leq N$
- All inputs are integers

Example

Sample Input	Sample Output
4 4 0 3 0 1 3 0 3 3	1 2 5 7
5 7 0 0 1 0 1 5 1 6 3 2	1 2 3 4 8

Explanation of sample test

The following diagram is an illustration of Sample Test 1 after all three-mouthed-sheep have appeared:



The red 'X's indicates the location of a three-mouthed-sheep, and the blue circles indicates a dangerous starting position.

Scoring

There are 5 subtasks in this problem. The score and additional constraints of each subtask are as follows:

Subtask	Score	Additional constraints
1	7	$n, C \leq 30$
2	10	$n \leq 5 \times 10^4, C \leq 1000$
3	14	$n \leq 1000$
4	31	$n \leq 5 \times 10^4$
5	38	No other constraints