Misère

Time limit: 2 seconds
Memory limit: 1024 megabytes

Préférence is a card game which is very popular in Eastern Europe. It is usually played with a 32-card deck, which consists of pip cards from 7 to 10, Jack, Queen, King, and Ace in each of the four suits: Spades, Clubs, Diamonds, and Hearts. In each round of the game, three players receive ten cards each, and two cards are left on the table as a talon. Then, a phase of auction happens, where players make their bids, which are obligations to take at least a certain number of tricks. A special case of a bid is a so-called *misère*, which is an obligation to take no tricks regardless of other players' moves.

In this task, we will consider a special modification of préférence which is played with a modified deck containing $A \cdot B$ cards, where A is a number of suits, and B is the number of ranks in each suit. For example, the standard 32-card deck for the préférence game has $A = 4$ suits and $B = 8$ ranks. For convenience, we'll number the suits from 1 to A, and the ranks from 1 to B.

You need to solve a puzzle about this modification of préférence. In this modification, we'll say that a misère is *guaranteed* if for every suit, after we order the cards belonging to this suit in your hand by their rank as $b_1 < b_2 < \cdots < b_k$ (where k is the number of cards of the suit in your hand), the following condition is satisfied: $b_i \leq 2i - 1$ for all i from 1 to k. If you don't have any cards of the suit ($k = 0$), the condition is trivially satisfied.

You have n cards in your hand, and you will be allowed to choose any x cards you don't have and add them to your hand. Then, you must select any x of your $n + x$ cards and drop them, leaving some n cards in your hand. Your task is to find the smallest possible x such that you can transform your hand to a guaranteed misère.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \leq t \leq 1000$). The description of the test cases follows.

The first line of each test case contains three integers n, A, and B, denoting the number of cards in your hand, the number of suits in the deck, and the number of ranks in the deck ($1 \leq n \leq 5000$; $1 \leq A, B \leq 10^9$).

The i-th of the following n lines contains two integers a_i and b_i and describes one card, where a_i is the suit of the i-th card, and b_i is its rank ($1 \leq a_i \leq A$; $1 \leq b_i \leq B$). All the cards in your hand are distinct.

It is guaranteed that the sum of n over all test cases does not exceed 5000.

Output

For each test case, print the smallest non-negative integer value of x such that you can transform your hand to a guaranteed misère by first adding x cards that you don't have to your hand, and then dropping any x cards from your hand.

It can be shown that such a value of x always exists.

Example

standard input	standard output
2 4 2 6 1 1 1 2 1 6 2 3 2 4 5 3 4 2 4	1 2