**Tsunami**

There is one island, rich in natural resources. But the island suffers from frequent tsunamis. So there are k watchtowers. Each watchtower notifies all the other ones if it sinks under water. The island is flat: that is, when there is a tsunami, watchtowers on the seashore will first sink under water.

Due to the layout of watchtowers, each tsunami first makes two of them sink under water at once. In that case, people working at watchtowers should escape to the farthest one: that is, the farthest watchtower from the straight line linking two watchtowers under water. You can assume that no three watchtowers are on a line.

Tsunamis are frequent on this island. Once there was a tsunami and two watchtowers sank under water, one of them should sink under water again at the next tsunami. Also the watchtower has equipped with complex electronic systems, which fails sometimes and reports a “false” report. A normal report consists of two watchtowers where exactly one of them was included in the previous normal report and all the remaining watchtowers are on the same side of the line segment linking these two watchtowers. If not, then it is a false report. You can safely ignore false reports. Also, there are two or more watchtowers satisfying the above condition, choose the one with smallest x-coordinate. If x-coordinates are the same, then choose the one with smallest y-coordinate.

The island is a n x n grid, where the lower leftmost point is (0, 0). You can assume that the x-coordinate and y-coordinate of each watchtower is integers. The following figure is an example of nine watchtowers on a grid of 6 x 6. There are nine watchtowers on (0, 4), (0, 2), (1, 5), (1, 0), (2, 3), (3, 5), (4, 1), and (5, 4), (5, 2). They are labeled by integers between one and nine in that order.



If a report saying that watchtower two and watchtower four are under water, the farthest one from the line linking them is watchtower 8. If the next report says that watchtower five and watchtower seven are under water, you can see that it is a false report, so it is ignored. If the next report says that watchtower one and watchtower two are under water, there are two watchtowers farthest from the line linking them: watchtower eight and watchtower nine. By the condition mentioned above, the answer should be watchtower nine. If the next report says that watchtower one and watchtower six are under water, you see that watchtower three is on a different side of the line linking them, so it is also a false report and should be ignored. If the next report says that watchtower one and watchtower three are under water, the answer is watchtower seven. Finally, the last report says that watchtower one and two are under water, the answer is watchtower nine.

Given the size of grid, the number of watchtowers and their positions, and reports of tsunami, your program should compute the watchtower where all the people should escape to.

[Input]

The first line of the input file contains the number T of test cases in the file, where T ≤ 100. In each test case, the first line contains three integers n, k, and m, where n is the size of the island (1 ≤ n ≤ 10,000,000), k is the number of watchtowers (1 ≤ k ≤ 2n), and m is the number of tsunamis (1 ≤ m ≤ n). Each of the next k lines includes two integers xi and yi, meaning that watchtower i in that order is on (xi, yi). Each of the next m lines contains two integer u and v, meaning a report saying that watchtower u and watchtower v are under water.

There are three kinds of inputs listed as follows.

* Set 1: n ≤ 500.
* Set 2: n ≤ 10,000.
* Set 3: n ≤ 10,000,000.

[Output]

For each report, compute the number of watchtower where everyone should escape to. Add them up, and report the remainder left after dividing the sum by 1,000,000,007. You can assume that the number of watchtower for a false report is zero.

[I/O Example]  
Input

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| --- |
| 1  6 9 6  0 4  0 2  1 5  1 0  2 3  3 5  4 1  5 4  5 2  4 2  5 7  1 2  1 6  3 1  2 1 |

Output

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| --- |
| 33 |