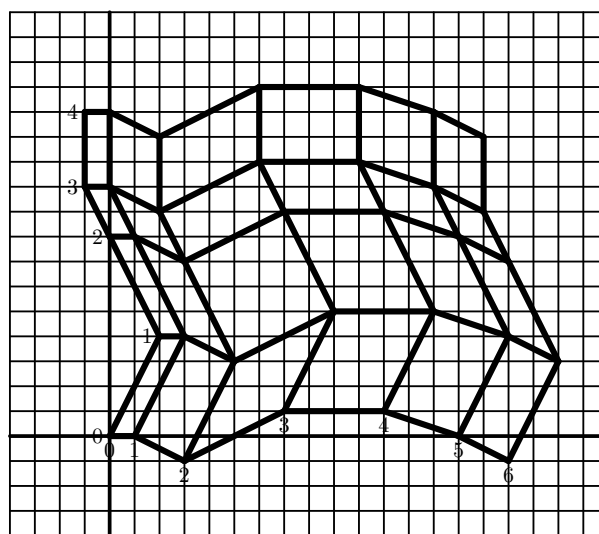


City Center

X24039_en

The city center of the capital of Meashara contains two kinds of streets: horizontal and vertical ones. Vertical ones go roughly from South to North; there are sometimes deviations, but the angle between the street and South-North is never greater than 30 degrees. Likewise, horizontal ones go roughly from West to East, and the deviation is never greater than 30 degrees. Both vertical and horizontal streets are numbered with consecutive integers. Even though some street fragments don't go strictly North or East, the structure of the city center has some regularity: the region between two neighboring vertical streets, and two neighboring horizontal streets, is always a parallelogram.



George Zynoulus is running a company producing navigational systems. Currently the navigational system is able to tell the receiver's coordinates. However, this is not enough for the citizens, who rather want to know their current address. Your task is to, given a description of streets and coordinates, quickly determine the address of the crossing that the receiver is currently on, that is, the numbers of horizontal and vertical streets which cross there.

Input

The first row contains three numbers $1 \leq n \leq 25000$, $1 \leq e \leq 25000$ and $1 \leq k \leq 25000$. These are, respectively, number assigned to the last horizontal street, number assigned to the last vertical street, and the number of queries (coordinates of crossings recorded by the receiver).

We assume that the 0th Vertical Street and the 0th Horizontal Street cross at (0,0). Point (1,0) is 1 Measharan meter to the East, and point (0,1) is 1 Measharan meter to the North.

For $i = 1..n$, each following line contains two integers x_i^N and y_i^N , which denote the coordinates of the crossing of i -th Horizontal Street and 0th Vertical Street. Each y_i^N is greater than the previous one.

Then, for $i = 1..e$, each following line contains two integers x_i^E and y_i^E , which denote the coordinates of the crossing of 0th Horizontal Street and i -th Vertical Street. Each x_i^E is greater than the previous one.

Then, for $i = 1..k$, each following line contains two numbers x_i and y_i . These are coordinates of the crossing that we have to find.

Each point in the city center has coordinates (x, y) such that $-2000000000 \leq x, y \leq 2000000000$.

Output

Output should consist of k rows. In i -th row of input give the address of i -th crossing.

Sample input

```
4 6 6
2 4
0 8
-1 10
-1 13
1 0
3 -1
7 1
11 1
14 0
16 -1
-1 13
0 13
13 5
13 5
7 9
14 8
```

Sample output

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

Problem information

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Generation : 2013-09-02 16:01:23

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