Task 4

Finding Stars

Task

You are looking for a constellation in a photograph of stars. The constellation to find is known to appear exactly once in the photograph in the same shape, the same orientation, and the same size. Note that other stars, which have nothing to do with the constellation to find, may appear in the photograph.

For example, the constellation in Figure 1 appears in the photograph in Figure 2 (marked with circles). The given constellation has to be translated by 2 along the x-axis and -3 along the y-axis to match its occurrence in the photograph.

Write a program which, given the constellation to find and the positions of the stars appearing in the photograph, reports how much the given constellation has to be translated to match its occurrence in the photograph.

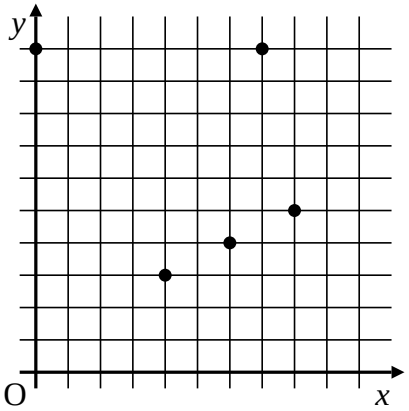

Figure 1: A constellation to find.

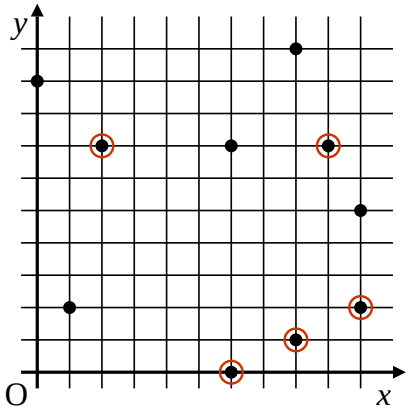

Figure 2: A photograph of stars.

Input

Line 1 contains the number m of the stars in the constellation to find. It is followed by m lines containing two space-separated integers representing the x- and y-coordinates of the m stars composing the constellation to find. Line $m + 2$ contains the number n of the stars appearing in the photograph. It is followed by n lines containing two space-separated integers representing the x- and y-coordinates of the n stars in the photograph.

No two stars in the constellation have the same location, and neither do two stars in the photograph. The numbers m and n satisfy $1 \leq m \leq 200$ and $1 \leq n \leq 1000$. The x- and y-coordinates of all the stars are between 0 and 1000000, inclusive.

Output

Each output file to submit consists of one line, which contains two space-separated integers. These integers represent the amount to translate the given constellation so that it matches the occurrence in the photograph. The first integer is the amont along the x-axis, and the second integer is the amount along the y-axis.

Sample inputs and outputs

Sample input 1 and sample output 1 correspond to the figure above.

Sample input 1

```
5
8 5
6 4
4 3
7 10
0 10
10
10 5
2 7
9 7
8 10
10 2
1 2
8 1
6 7
6 0
0 9
```

Sample input 2

```
5
904207 809784
845370 244806
499091 59863
638406 182509
435076 362268
10
757559 866424
114810 239537
519926 989458
461089 424480
674361 448440
81851 150384
459107 795405
299682 6700
254125 362183
50795 541942
```

Sample output 1

```
2 -3
```

Sample output 2

```
-384281 179674
```