Problem C. Christmas Sky

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

This Christmas you are going to pay a visit to your beloved grandparents. You begin to remind yourself of the beautiful memories you have with them as a child. In particular, you remember that you and your grandfather used to look at the sky every Christmas night, gazing at the bright stars, and taking photos of them.

You want to give your grandpa a special greeting card for Christmas this year, in honor of your memories together. You took a photo of last night's sky, where n bright stars (described by points in the 2D plane) can be seen. However, in the meantime, you found a very similar old photo taken some years ago, having m bright stars. While deciding for a message for your grandpa, you begin to think: how actually similar is the sky in this photo to the one on the old photo?

You try to move the new photo around (without rotating it), trying to make it overlap the most with the old photo. The photos overlap the most when the **maximum distance** (in Euclidean norm) between one of the m stars in the old photo and one of the n stars in the new photo is **as small as possible**.

Write a program that computes the minimum such distance, as well as how you should translate the new photo in order to obtain this distance.

Input

The first line of the input contains a single integer n ($1 \le n \le 1000$) — the number of stars in the new photo.

Then i-th of the next n lines contains two integers x_i, y_i ($1 \le x_i, y_i \le 10^6$), describing the star with coordinates (x_i, y_i) on the new photo.

The next line of the input contains a single integer m ($1 \le m \le 1000$) — the number of stars in the old photo.

Then m lines follow, describing each star in the old photo in an identical manner.

All n stars in the first photo are at distinct locations. All m stars in the second photo are also at distinct locations.

Output

Output three numbers: d, t_x, and t_y, separated by space, representing the minimum distance required, as well as how much the new photo should be translated in order to obtain this minimum distance. The answer would be considered correct if your answer d, as well as the distance given by the translation vector (t_x, t_y) are within absolute or relative error of at most 10^{-7} to the real answer.

Examples

standard input	standard output
3 1 5 2 4 6 8 2 1 3 1 6	4.03112887415 -3 -1.5
1 5 1 1 4 9	0 -1 8

Note

In the first sample test, after translating the new photo by the vector $t = (-3, -1.5)$, we obtain the new stars at coordinates $(-2, 3.5)$, $(-1, 2.5)$ and $(3, 6.5)$. The maximum distance in this case is $\sqrt{16.25}$, given by the distance between the second star in the new photo and the second star in the old photo. It can be proved that no smaller distance may be achieved.