Railway is a broken line of N segments. The problem is to find such a position for the railway station that the distance from it to the given point M is the minimal.

Input

The input will consist of several input blocks. Each input block begins with two lines with coordinates X_m and Y_m of the point M. In the third line there is N — the number of broken line segments. The next $2N + 2$ lines contain the X and the Y coordinates of consecutive broken line corners.

The input is terminated by ¡EOF¿.

Output

For each input block there should be two output lines. The first one contains the first coordinate of the station position, the second one contains the second coordinate. Coordinates are the floating-point values with four digits after decimal point.

Sample Input

```
6
-3
3
0
1
5
5
9
-5
15
3
0
0
1
1
0
2
0
```

Sample Output

```
7.8966
-2.2414
1.0000
0.0000
```