Problem D
The Antman In The Endgame
Time Limit: 1 second

After Thanos destroyed haft population of the universe, Antman and the survivals in the Avenger team have to travel back in time to collect the infinity stones to reverse the destruction and revive their friends.

When travelling back in time, Antman gets lost on the 2D plane in spatio-temporal dimension. There are n square stones on this plane. All the square stones have non-zero area and there are not any two stones whose area of intersection $S > 0$. After wandering a while, he sees the exit, but he needs to find the way to get there.

He is in hurry! He needs to get out of here as soon as possible before it is too late! You have to help him find the shortest path from his current position to the exit knowing that:

- The Antman can walk freely outside the square stones.
- The Antman can walk on the edges of the square stones. He can also walk between the stones if they share an edge.
- The current position of the Antman and the exit do not lie inside any square stones.
- There are not any cases that the Antman's position is identical to the exit initially.

Input

The first two lines contain the coordinate of the current coordinate of the Antman and of the coordinate of the exit.

The third line contains the number n ($1 \leq n \leq 1000$) - the number of square stones.

The next n lines contain descriptions of the square stones. Each square is given by 4 integers which are the coordinates of 2 opposite angles, and its edges are parallel to the coordinate axes. All coordinates are given in the format x, y, where x and y are integers that do not exceed 10^9 in absolute value.

Output

Display the shortest path from the current position of the Antman to the exit. The result has exactly six digits after the decimal place.

Sample Input	Sample Output
0 0 5 0 2 1 -1 4 2 1 -1 3 -3	5.828427