A Airport Logistics

Many airports have moving conveyor belts in the corridors between halls and terminals. Instead of walking on the floor, passengers can choose to stand on a conveyor or, even better, walk on a conveyor to get to the end of the corridor much faster.

The brand new Delft City Airport uses a similar system. However, in line with the latest fashion in airport architecture, there are no corridors: the entire airport is one big hall with a bunch of conveyor lines laid out on the floor arbitrarily.

To get from a certain point A to a certain point B, a passenger can use any combination of walking on the floor and walking on conveyors. Passengers can hop on or off a conveyor at any point along the conveyor. It is also possible to cross a conveyor without actually standing on it.

Walking on the floor goes at a speed of 1 meter/second.
Walking forward on a conveyor goes at a total speed of 2 meter/second.
Walking in reverse direction on a conveyor is useless and illegal, but you may walk on the floor immediately next to the conveyor. (Conveyors are infinitely thin.)

How fast can you get from A to B?

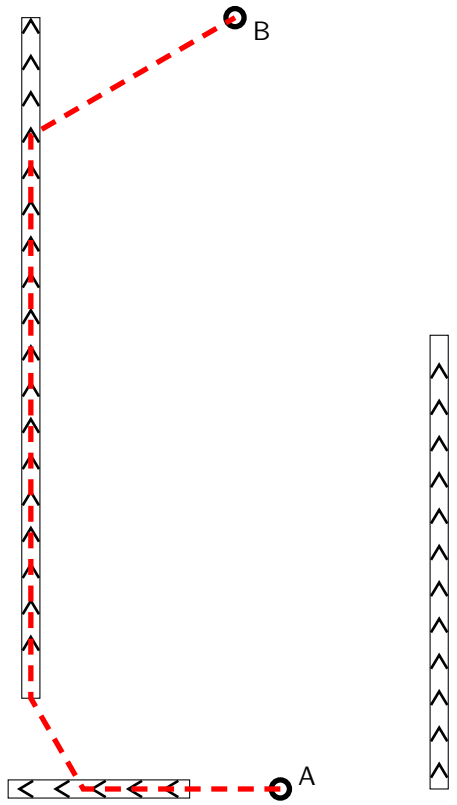


Figure 1: Fastest route for first example input.

Input

The first line contains four floating point numbers, X_A, Y_A, X_B, and Y_B. They describe the coordinates of your initial location $A = (X_A, Y_A)$ and your final location $B = (X_B, Y_B)$.

The second line contains an integer N, the number of conveyors in the hall ($0 \leq N \leq 100$). The following N lines each contain four floating point numbers, X_1, Y_1, X_2, and Y_2, describing a conveyor which starts at the point (X_1, Y_1) and ends at the point (X_2, Y_2), running in a straight line from start to end.

All coordinates are floating point numbers in the range $(0 \leq X, Y \leq 1000.0)$, expressed in units of meters.

Conveyors are at least 1 meter long. Conveyors do not intersect or touch.
Your start and destination are not on any conveyor.

Output

Write one line with a floating point number, the minimum time (in seconds) needed to get from A to B in seconds.

Your answer may have an absolute error of at most 10^{-4}.

Sample Input 1	**Sample Output 1**
60.0 0.0 50.0 170.0 3 40.0 0.0 0.0 0.0 5.0 20.0 5.0 170.0 95.0 0.0 95.0 80.0	168.791651

Sample Input 2	**Sample Output 2**
60.0 0.0 50.0 170.0 3 40.0 0.0 0.0 0.0 5.0 20.0 5.0 170.0 95.0 0.0 95.0 100.0	163.527474

Sample Input 3	**Sample Output 3**
0.0 1.0 4.0 1.0 1 0.0 0.0 4.0 0.0	3.732051

Sample Input 4	**Sample Output 4**
0.0 1.0 10.0 1.0 2 1.0 0.0 2.0 3.0 6.0 1.0 4.0 1.0	10.000000