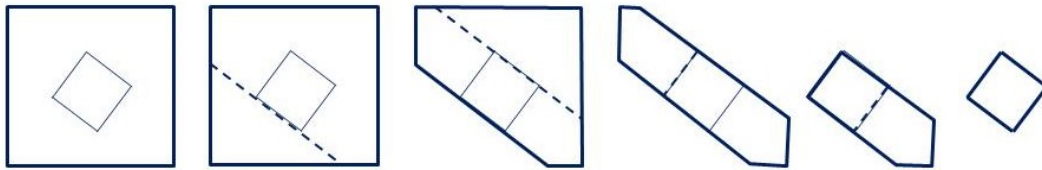


Problem A. Cut It Out!

Input file: *standard input*
Output file: *standard output*
Time limit: 3 seconds
Memory limit: 512 mebibytes

You are given two convex polygons A and B . It is guaranteed that B is strictly contained inside of A .

You would like to make a sequence of cuts to cut out B from A . To do this, you draw a straight line completely through A that is incident to one of the edges of B , which separates A into two pieces. You cut along this line and discard the piece that doesn't contain B . You repeat this until the piece that you have left is exactly B .



The cost of making a cut is equal to the length of the cut (i.e. the length of the line through the remainder of A). Given A and B , find the minimum cost needed to cut B out.

Input

Each input will consist of a single test case. Note that your program may be run multiple times on different inputs. Each test case will begin with a line containing a single integer a ($3 \leq a \leq 200$), which is the number of points in polygon A . Each of the next a lines will contain two integers x and y ($-10^6 \leq x, y \leq 10^6$), which are the vertices of polygon A , in clockwise order. It is guaranteed that polygon A will be convex.

The next line will contain a single integer b ($3 \leq b \leq 200$), which is the number of points in polygon B . Each of the next b lines will contain two integers x and y ($-10^6 < x, y < 10^6$), which are the vertices of polygon B , in clockwise order. It is guaranteed that polygon B will be convex. It is also guaranteed that polygon B will reside entirely within the interior of polygon A .

No three points, within a polygon or across polygons, will be collinear.

Output

Output a single floating point number, which is the minimum cost to cut B out of A . To be considered correct, this number must be within a relative error of 10^{-6} of the judges' answer.

Examples

standard input	standard output
4 0 0 0 14 15 14 15 0 4 8 3 4 6 7 10 11 7	40.0000000000
4 -100 -100 -100 100 100 100 100 -100 8 -1 -2 -2 -1 -2 1 -1 2 1 2 2 1 2 -1 1 -2	322.1421356237