Problem E. Edges Are Too Sharp!

Input file:	stdin
Output file:	stdout
Time limit:	1 second
Memory limit:	256 megabytes

The company "Nanozavod, Inc." is specialized on design and assembly of nanobots. Now they meet another problem on their long way. Artificial joints require pieces of nanoribbons of exact length. Developers can create nanoribbon segments of the known lengths, but they are too long. Now they are trying to cut a segment into two parts of equal length.

A nanocutter looks like a hollow polygonal prism with another prism inside it. The inner prism has very sharp edges and is used to cut nanoribbon: when a piece of nanoribbon touches any edge of the inner prism, it is immediately cut in the contact point. Unfortunately, if a ribbon touches the inner prism in more than one point but by some longer segment (for example, it contacts the entire edge of the prism at the same moment), the whole piece of nanoribbon is completely destroyed. The outer prism is used to hold a piece of nanoribbon: the endpoints of the ribbon must be put onto the side surface of the outer prism. The tension of the ribbon is exactly uniform.

So, the developers now have to find two points on the outer prism's side surface such that the segment connecting these points has exactly one common point with the inner prism, and this common point is the middle point of the segment. All edges of both prisms which connect their base faces are parallel, so the problem can reduced to the same two-dimensional problem for the base faces of the prisms. Coordinates of both prisms' vertices are integers, bottom vertices form two polygons that are strictly convex (that is, there are no 180-degree corners of polygons). The inner polygon is strictly inside the outer one (their borders have no common points). Your task is to find coordinates of ends of any segment that satisfies the conditions of the problem. It is guaranteed that at least one such segment exists.

Input

The first line of input contains two integers: M is number of outer polygon vertices and N is number of inner polygon vertices ($3 \le M, N \le 3 \cdot 10^5$).

The following $M + N$ lines contain two integers x and y each ($|x|, |y| \le 10^7$) that are coordinates of the polygon vertices (first M lines for the outer polygon, next N lines for the inner polygon). Vertices of each polygon are given in counterclockwise order.

It is guaranteed that the inner polygon is strictly inside the outer one.

Output

Print four real numbers x_1, y_1, x_2, y_2 specifying the coordinates of the nanoribbon's endpoints. The coordinates must be given with absolute error no more than $\varepsilon = 10^{-4}$ (that is, there must exist an exact solution to the problem (X_1, Y_1, X_2, Y_2) such that $|x_1 - X_1| < \varepsilon$ etc.). If there are multiple answers, print any one of them.

Examples

stdin	stdout
3 3 0 0 4 0 0 4 1 1 2 1 1 2	2.000000 0.000000 2.000000 2.000000