Easter Eggs

Problem description

You have the euclidian coordinates of a couple of easter eggs. Find the smallest round tour that visits all eggs and returns to its starting point. What is the length of this tour?

Input

A number n followed by n pairs of floating numbers – the x- and y-coordinates of the n eggs. Here $|x|, |y| < 10000$ and $1 \leq n \leq 10$.

Output

The length of the shortest round tour with a maximal error of 10^{-6}.

Sample input/output

Input	Output
4 0.0 5.0 2.0 2.0 5.0 0.0 0.0 0.0	17.2111025509