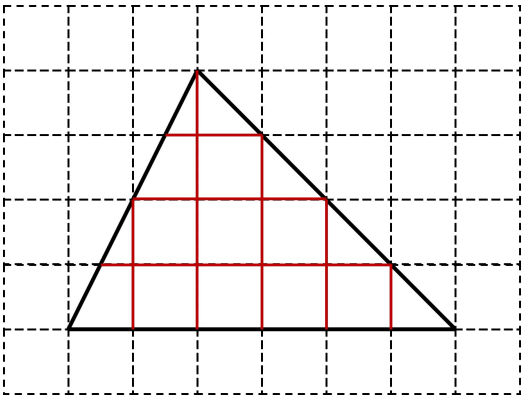
The Polygon



Consider a polygon of n vertices lying on a two dimensional plane. The vertices are integers, and the polygon can be convex or concave.

Calculate the total length of the grid line strictly inside the polygon (do not consider the polygon's edge).

Input

The first line contains an integer $n(3 \leq n \leq 10^5)$.

The i^{th} line in the next n lines contains 2 integers $x_i, y_i(|x_i|, |y_i| \leq 10^9)$ – the coordinate of the vertex i^{th}. The vertices are distinct and are listed in a counter-clockwise or clockwise.

Output

The output contains a single real number L – the total length of the inside grid, with the error does not exceed 10^{-3}.

Samples

INPUT	OUTPUT
3 5 6 7 10 11 6	21