Building a Sealed-Off Campus

Timelimit: 1 sec

Problem description

Once upon a time there was a programming war between the RWTH Aachen and the other German universities. Because defense is no offense at all, but necessary (definitely not Sun Tzu, The Art of War), the RWTH decided to build a great wall that encompasses all buildings of the RWTH. As these were hard times, in which there was not even money to heat the corridors, the wall had to be as short as possible to save costs. Although this project was a complete failure and no wall was build, you wonder how this wall would have looked like. How long would this wall have to be and how much area would lie inside?

We assume that buildings are represented by a single point. Moreover, we consider a building to be inside the wall already if the building is located exactly on the wall.

Input

The input consists of:

- One line with one integer n ($1 \leq n \leq 1000$), the number of buildings that are owned by RWTH.

- n lines follow, each containing two floating point numbers x_i and y_i ($0 \leq x_i, y_i \leq 10000$), which are the cartesian coordinates of building i.

Output

Output two floating point numbers l and a, the length of the wall and the area inside. The output should have an absolute or relative error of at most 10^{-5} (whichever is lower).

Sample input/output

Input	Output
5 0 0 100 100 0 100 100 0 50 50	400 10000

Input	Output
4 0 0 10.5 10.5 20.3 20.3 31.5 31.5	89.09545443 0