

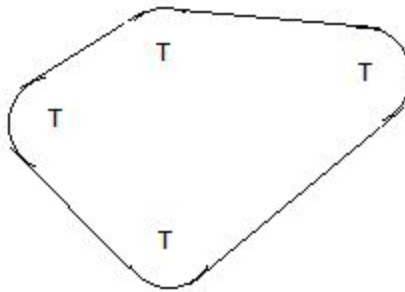
Problem B: Farmer John's Forest

Filename: forest

Time limit: 1 second

Farmer John recently got an opportunity to acquire a forest next to his many pastures. Naturally, some of his cows venture from the pastures to the forest, out of curiosity. Unfortunately, the forest isn't a friendly place for a cow. Many creatures, such as snakes, lurk and can cause harm to Farmer John's cows. To prevent the cows from getting into the forest, Farmer John has decided to build a fence.

He would like to build a single fence of minimum length that encloses all of the trees in the forest. For the purposes of this problem, each tree in the forest can be treated as a point on the Cartesian plane, but there must be at least a c foot distance from any tree to the fence, so that the fence does not interfere with the growth of the roots of the tree. Here is an illustration of a fence with a minimum clearance for each of the four trees. The position of each tree is labeled with the letter 'T':



Write a program to help calculate the minimum length of fence that is necessary for Farmer John, as well as the area that will be enclosed by that fence.

Input

The first line of input will contain a two positive integers: n ($n \leq 50,000$), and c ($c \leq 1000$), representing the number of trees in Farmer John's Forest that need to be enclosed and the minimum distance of any tree to the fence, respectively. n lines of input follow. The i^{th} of these contain two space separated integers, x_i and y_i ($-10^4 \leq x_i, y_i \leq 10^4$), the Cartesian coordinates of the i^{th} tree.

Output

On a single line, output the minimum length of Farmer John's Fence, as well as the area it encloses. Output both values to precisely two decimal places and separate the output on the line with a single space.

Samples

Input	Output
5 1 0 0 10 0 0 10 5 5 10 10	46.28 143.14
6 4 10 41 31 20 50 20 30 41 40 30 21 20	126.84 971.59