

1%-Euclidean

Input file: **standard input**
Output file: **standard output**
Time limit: **2 seconds**
Memory limit: **512 megabytes**

Given n points p_1, p_2, \dots, p_n in the two-dimensional Euclidean plane, calculate the total pairwise Euclidean distance between them. Simple as that.

Recall that Euclidean distance between two points $a = (x_1, y_1)$ and $b = (x_2, y_2)$ is defined as follows:

$$\text{dist}(a, b) = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

Input

The first line of input contains a single integer n ($1 \leq n \leq 500\,000$), the number of points.

The i -th of the following n lines contains a pair of integers x_i, y_i ($-10^6 \leq x_i, y_i \leq 10^6$), the coordinates of p_i .

Output

Output the value of $\sum_{i < j} \text{dist}(p_i, p_j)$. Your answer will be considered correct if its relative or absolute error does not exceed 10^{-2} .

Examples

standard input	standard output
3 -1 2 2 2 -1 -2	12.0000000000
4 0 0 2 0 0 2 2 2	13.6568542490

Note

In the first sample test the pairwise distances are 3, 4 and 5.

In the second sample test the pairwise distances are 2, 2, 2, 2, $2\sqrt{2}$, $2\sqrt{2}$.