F: Farmer Jane

Source file name: `farmer.c`, `farmer.cpp`, *or* `farmer.java`

Farmer Jane owns farming land in a city where property boundaries are defined by trees. The city council has determined that in order to avoid conflicts among neighbors, it will guarantee that in every property in the city, it should be possible to go from every point in the property, to any other point, using a straight path without leaving its boundaries.

As a property owner, Farmer Jane must install an irrigation system to keep the trees delimiting her property in great condition. She has decided to install a single water sprinkler in some place of her property to water all the trees, but she wants to minimize the costs of doing so. The cost of watering a single tree, is given by the square of the distance from the tree to the sprinkler, times the amount of water needed by the tree. This is, for a tree located in position (x_i, y_i) that needs w_i units of water, and a sprinkler located in position (x, y), the cost of watering the tree is given by $w_i \cdot ((x_i - x)^2 + (y_i - y)^2)$. The cost of watering N trees is given by $\sum_{i=1}^{N} w_i \cdot ((x_i - x)^2 + (y_i - y)^2)$.

Given the number N of trees delimiting the property, and values x_i, y_i, w_i for each tree, your task is to find the minimum cost of installing the sprinkler. It is possible to install a sprinkler in a point (x, y) where x and y are real numbers. Also, it is possible to install the sprinkler in the same position of a tree and in the boundaries of the property.

Input

The input consists of several test cases. The first line of a test case contains a single integer N indicating the number of trees delimiting the property ($3 \leq N \leq 100$). Then follow N lines: line i contains exactly 3 blank-separated integers x_i, y_i, and w_i, where (x_i, y_i) is the position of the i-th tree ($0 \leq x_i \leq 1000$, $0 \leq y_i \leq 1000$), and w_i is the number of units of water needed by the i-th tree ($1 \leq w_i \leq 10$). You may assume that there are not two trees located in the same position, and that the area of the property is a non-empty convex polygon.

The input must be read from standard input.

Output

For each test case, print a single line with a number indicating the minimum cost of installing the sprinkler in the property. The answer should be formatted and approximated to three decimal places. The floating point delimiter must be '.' (i.e., the dot). The rounding applies towards the *nearest neighbor* unless both neighbors are equidistant, in which case the result is rounded up (e.g., 78.3712 is rounded to 78.371; 78.5766 is rounded to 78.577; 78.3745 is rounded to 78.375, etc.).

The output must be written to standard output.

Sample Input	**Sample Output**
4 1 0 2 5 4 2 1 4 3 7 0 6 3 2 1 5 2 5 1 5 3 3	148.308 34.889