G. Convex Polygon MST

Problem ID: G

There is a convex polygon with n vertices on a plane. Let V be the set of vertices of this convex polygon. After removing all the edges of the convex polygon, you will create a tree with n vertices by repeating the following operation $n-1$ times:

- Select two distinct vertices $x, y \in V$. Add an edge between vertices x and y. If we denote the Euclidean distance between vertices x and y as $d(x, y)$, you gain a score of $(d(x, y))^2$ points.

Find the maximum possible total score obtained by $n-1$ operations.

Input

The input file contains multiple test cases. The first line contains an integer t representing the number of test cases. Following that, t test cases are given. Each test case is given in the following format:

n
$x_1\ y_1$
$\vdots$
$x_n\ y_n$

Here, n is an integer representing the number of vertices.

Integers x_i and y_i represent the coordinates of the i-th vertex.

- $3 \leq n \leq 1.2 \times 10^5$
- The sum of all n values in a single input file is guaranteed to be less than or equal to 1.2×10^5
- $-10^9 \leq x_i, y_i \leq 10^9$
- The vertices are given in counterclockwise order when viewed from the centroid of the convex polygon.
- Three different vertices of the convex polygon do not lie on a single line.

Output

Output the maximum possible total score obtained by $n-1$ operations.

Note

- The Euclidean distance between coordinates (x_1, y_1) and (x_2, y_2) is calculated as $\sqrt{|x_1 - x_2|^2 + |y_1 - y_2|^2}$.
- Note that the answer can exceed 2^{64}.

Sample Input 1	Sample Output 1
2 4 0 0 1 0 1 1 0 1 6 986288255 165031740 -353860917 -935298054 -173584601 -984818960 141060317 -990001002 341839727 -939758266 662792114 -748803453	5 10426936519662708146