

Problem G. Generate Tree From Polygon

Input file: *standard input*
Output file: *standard output*
Time limit: 9 seconds
Memory limit: 1024 mebibytes

There is a convex polygon with n vertices on a plane. Consider an undirected graph (V, E) where V is the set of vertices of this convex polygon, and E is initially empty. Repeat the following operation $n - 1$ times in such a way that, in the end, the graph becomes a tree:

- Select two distinct vertices u and v from V .
- Add an edge between vertices u and v to E .
- If we denote the Euclidean distance between vertices u and v as $d(u, v)$, you gain a score of $(d(u, v))^2$ points.

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

Input

The first line of input contains a single integer t : the number of test cases. The test cases follow.

Each test case starts with a line containing a single integer n : the number of vertices in the polygon ($3 \leq n \leq 120\,000$).

Then n lines follow. Each of them contains two integers x_i and y_i : the coordinates of the i -th vertex of the polygon ($-10^9 \leq x_i, y_i \leq 10^9$). The vertices are given in counterclockwise order. The polygon is guaranteed to be convex. No three vertices lie on the same line.

The sum of all values of n in a single input is guaranteed to be at most 120 000.

Output

For each test case, output a line with a single integer: the maximum possible total score obtained after $n - 1$ operations that form a tree.

Example

<i>standard input</i>	<i>standard output</i>
2	5
4	10426936519662708146
0 0	
1 0	
1 1	
0 1	
6	
986288255 165031740	
-353860917 -935298054	
-173584601 -984818960	
141060317 -990001002	
341839727 -939758266	
662792114 -748803453	

Note

Note that the answer can exceed 2^{64} .