

Problem K. Symmetry: Convex

Input file: *standard input*
Output file: *standard output*
Time limit: 2 seconds
Memory limit: 256 mebibytes

Given is a strictly convex polygon with n vertices $p_1, p_2, \dots, p_n$ in counterclockwise. Denote C_i as the polygon with i vertices $p_1, p_2, \dots, p_i$. For each $i = 3, 4, \dots, n$, find the lines which C_i is symmetric about.

Input

There are multiple test cases. The first line of input contains an integer T ($1 \leq T \leq 10^5$), the number of test cases. For each test case:

The first line contains an integer n ($3 \leq n \leq 3 \cdot 10^5$), the number of vertices.

The i -th of the following n lines contains two integers x_i, y_i ($-10^9 \leq x_i, y_i \leq 10^9$), the coordinates of p_i .

It is guaranteed that the vertices are given counterclockwise, and the polygon is strictly convex, that is, no three vertices are collinear.

It is guaranteed that the sum of n in all test cases does not exceed $3 \cdot 10^5$.

Output

For each test case:

For each $i = 3, 4, \dots, n$, on the first line, output an integer k : the number of lines which C_i is symmetric about.

In each of the following k lines, output three integers a, b, c ($-2 \cdot 10^{18} \leq a, b, c \leq 2 \cdot 10^{18}$), denoting that C_i is symmetric about the line $ax + by + c = 0$.

If there are multiple answers, you can output any of them. For each i , you can output the lines in any order.

Example

standard input	standard output
3	1
4	1 1 -1
0 0	4
1 0	1 -1 0
1 1	0 2 -1
0 1	2 0 -1
3	1 1 -1
0 0	0
3 0	1
1 1	1 1 0
4	4
-1000000000 -1000000000	1 -1 0
1000000000 -1000000000	0 1 0
1000000000 1000000000	1 0 0
-1000000000 1000000000	1 1 0