

Problem D. Openspaces

Input file: *standard input*
Output file: *standard output*
Time limit: 3 seconds (*6 seconds for Java*)
Memory limit: 512 mebibytes

Each floor of Yandex office consists of several open spaces lying on the same plane. Employee number i is sitting at a desk, which for the sake of simplicity we assume to be a point with coordinates (x_i, y_i) . It is also known that each employee belongs to exactly one team working on something very valuable for Yandex. Of course, there are no employees sharing a desk in the company.

All the members of each team are located in the vertices of some convex polygon. Though the polygons may intersect, they do not meet at vertices. Additionally, no three desks in one team are collinear.

No one remembers why such strange requirements exist, but the Department of Employee Placement works hard to meet them.

One of the regular duties of this department is to count the number of different common outer tangents for each pair of team polygons. A common outer tangent for two polygons is a line that touches the boundary of each polygon at one or more points such that all the inner points of both polygons lie by the same side of it.

Help the Department of Employee Placement to automatize this task if you know that there are no more than 10^5 employees in Yandex.

Please remember that the Department has a lot of other important things to do, so make sure your solution is as fast as possible. We also strongly recommend to test it with 64-bit compilers.

Input

In the first line of the input there is a single integer N , number of different teams in Yandex ($1 \leq N \leq 400$). Then N team descriptions follow.

Each description starts with a line with an integer N_i : the number of members in the i -th team ($3 \leq N_i \leq 10^5$). Then follow N_i pairs of integers, one pair per line. A pair x_{ij}, y_{ij} denotes the planar coordinates of the j -th member of the i -th team ($-10^9 \leq x_{ij}, y_{ij} \leq 10^9$).

The sum of all N_i is guaranteed to be at most 10^5 .

Coordinates of team-members within one team are given in counter-clockwise order.

Output

Output N lines with N space-separated integers on each line.

The j -th number in the i -th ($j \neq i$) line must be equal to the number of common outer tangents of i -th and j -th team.

The i -th number in the i -th line must always be zero.

Example

standard input	standard output
3	0 6 4
4	6 0 6
3 1	4 6 0
8 1	
8 6	
3 6	
3	
5 0	
13 5	
2 7	
4	
2 5	
9 1	
12 2	
3 8	