

Problem D. Divide and Conquer

Time limit	1500 ms
Mem limit	262144 kB
Special judge	Yes
OS	Windows

Given n points in 2D plane, where $n \equiv 0 \pmod{4}$, no two points coincide and no three points are collinear. Find two intersecting lines satisfying that no given points lie in the two lines and that for each of the four divided areas, there are exactly $\frac{n}{4}$ given points. If multiple solutions exist, print any one of them. If no solution, print "-1" in one line.

Input

The first line contains one positive integer T ($1 \leq T \leq 20$), denoting the number of test cases. For each test case:

The first line contains one integer n ($4 \leq n \leq 50000$), denoting the number of given points.

Following n lines each contains two integers x_i, y_i ($|x_i|, |y_i| \leq 10^6$), denoting one given point (x_i, y_i) .

It is guaranteed that $\sum n \leq 10^5$, $n \equiv 0 \pmod{4}$, that no two points coincide and that no three points are collinear.

Output

For each test case:

If no solution, print "-1" in one line. Else print two lines each containing four integers x_1, y_1, x_2, y_2 ($(x_1, y_1) \neq (x_2, y_2)$) with absolute value not exceeding 10^9 , denoting one line passing $(x_1, y_1), (x_2, y_2)$ simultaneously.

Sample

Input	Output
2	0 1 0 -1
4	1 0 -1 0
-1 -1	1 0 2 3
-1 1	0 2 3 1
1 -1	
1 1	
8	
0 0	
0 1	
2 0	
2 1	
1 2	
1 3	
3 2	
3 3	