Problem I
Polygon Partition
Time Limit: 3 Seconds, Memory Limit: 2G

A simple polygon is a polygon that is not self-intersecting and does not contain any holes. You are given the N vertices of a simple polygon, v_1, v_2, $\ldots$, v_N, where $v_i = (x_i, y_i)$, and x_i and y_i are the x-coordinate and y-coordinate of the i^{th} vertex, respectively. The vertices are distinct and given in counterclockwise order (so there is an edge between each pair of consecutive vertices; there is also an edge from v_N back to v_1).

The polygon's boundary does not pass through any *lattice points* (a lattice point is a point where both coordinates are integers). In addition, none of the x_i or y_i values are exactly an integer.

A *semi-integer point* is a point where exactly one of its coordinates is an integer. Let $\mathcal{P} = \{p_1, p_2, \ldots, p_k\}$ be all of the semi-integer points that lie on the boundary of the polygon. For each semi-integer point p_i in $\mathcal{P}$, let n_i be the floor of the non-integer coordinate of p_i. For a subset $\mathcal{S}$ of $\mathcal{P}$, let $\sigma(\mathcal{S})$ be the sum of the n_i of the points in $\mathcal{S}$ (with $\sigma(\emptyset) = 0$). Does there exist a partition of $\mathcal{P}$ into two subsets $\mathcal{S}_1$ and $\mathcal{S}_2$ so that the $\sigma(\mathcal{S}_1) = \sigma(\mathcal{S}_2)$?

(Two sets $\mathcal{S}_1$ and $\mathcal{S}_2$ are a partition of $\mathcal{P}$ if $\mathcal{P} = \mathcal{S}_1 \cup \mathcal{S}_2$ and $\mathcal{S}_1 \cap \mathcal{S}_2 = \emptyset$. There are no other restrictions on $\mathcal{S}_1$ and $\mathcal{S}_2$ so long as these two conditions hold and $\sigma(\mathcal{S}_1) = \sigma(\mathcal{S}_2)$. In particular, empty sets are allowed, and the semi-integer points in each set *do not* have to be contiguous around the polygon boundary.)

Input

The first line of input contains one integer N ($3 \leq N \leq 500$), the number of vertices of the polygon.

Each of the next N lines contains two space-separated real numbers x_i and y_i ($-500 < x_i, y_i < 500$): the coordinates of the polygon vertices, in counterclockwise order. Each coordinate will have exactly 6 digits after the decimal point and will not be exactly an integer.

It is guaranteed that the polygon does not self-intersect, that the vertices are distinct, and that the polygon boundary does not pass through any lattice points.

Output

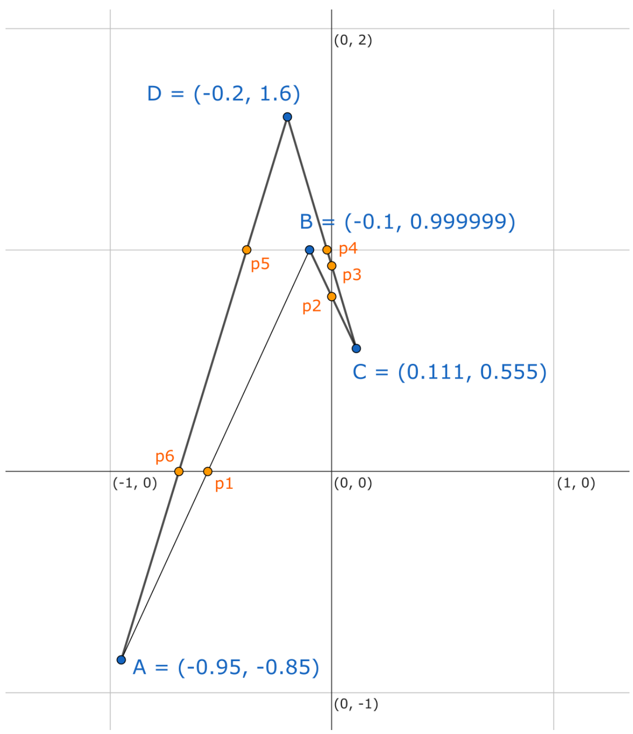
If there is no solution, print -1 and no further output.

Otherwise, print a single integer M on its own line: the number of semi-integer points in one of the two subsets in a valid partition of $\mathcal{P}$. On the next M lines of output, print the values n_i for the points in that subset, one per line.

If there are multiple valid partitions, you may choose any of them. You may print either of its two subsets, and you may list the subset's n_i values in any order.

Sample Explanation

Sample Input 1 is shown in the image below:



The points of the vertices are labeled A, B, C, D. The semi-integer points are marked in orange and labeled p_i going counterclockwise around the perimeter starting from A. The values n_i of the semi-integer points are, in the same order, $-1, 0, 0, -1, -1, -1$. Any subset of those values that sum to -2 would be accepted as correct. Sample Output 1 shows one possible correct answer.

The boundary of the polygon in Sample Input 2 does not intersect any semi-integer points, so $\mathcal{P}$ is empty, and it can be partitioned into two empty sets each with n_i sum of zero.

Sample Input 1	Sample Output 1
4 -0.950000 -0.850000 -0.100000 0.999999 0.111000 0.555000 -0.200000 1.600000	3 0 -1 -1

Sample Input 2	Sample Output 2
3 0.500000 0.700000 0.100000 0.200000 0.800000 0.900000	0

Sample Input 3	Sample Output 3
4 -360.000001 -24.000001 -359.999999 -24.000001 -359.999999 -23.999999 -360.000001 -23.999999	2 -25 -360