Problem J. Jordan

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	256 mebibytes

Jordan measure is a method of measuring sets in $\mathbb{R}^n$ space. In this problem, we will consider only two-dimensional space (Cartesian plane). The measure of a set S is a nonnegative real number and is denoted as $\mu(S)$. In most cases, the measure of a figure is its area.

If S is a rectangle with sides parallel to coordinate axes and side lengths a and b, then $\mu(S) = a \cdot b$ and S is called a *simple rectangle*. If S is a disjoint union of a finite number of simple rectangles ($S = R_1 \sqcup \ldots \sqcup R_n$), then $\mu(S) = \mu(R_1) + \ldots + \mu(R_n)$ and S is called a *simple set*. Although Jordan measure can also measure non-simple sets, it is not needed in this problem.

You have a polygon with n vertices with sides parallel to coordinate axes and want to calculate its measure by definition. You know that your figure is a simple set, so you have to split it into some non-intersecting simple rectangles. You are very lazy and do not want to calculate the measure many times, so you have to split the figure into the **minimum possible** number of rectangles.

Input

The first line of input contains one integer n: the number of vertices in the polygon ($4 \leqslant n \leqslant 500$, n is even). Each of the next n lines contains two space-separated integers: the coordinates of polygon vertices in counter-clockwise order. Coordinates do not exceed 10^4 by absolute value. The polygon is guaranteed to be a simple set, to have non-zero area and to have no self-touches and no self-intersections.

Output

The first line of output must contain k, the minimum possible number of rectangles. Each of the next k lines must contain four integers: the coordinates of two opposite vertices of the rectangle. No two rectangles in the output can intersect. The union of all rectangles must exactly form the input polygon.

Example

standard input	standard output
6 0 0 2 0 2 1 1 1 1 2 0 2	2 0 0 2 1 0 1 1 2