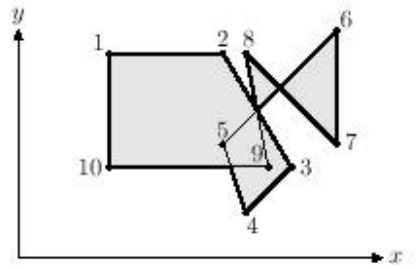


Closed polyline (with possible self-intersections) partitions a plane into a number of regions. One of the regions is unbounded — it is an *exterior* of the polyline. All the bounded regions together with the polyline itself form an *interior* of the polyline (shaded in the picture below). The *border* of the interior (bold line in the picture) is a polyline as well. This polyline has the same interior as the original one. Your task is to find the border of the interior of the given polyline.



To guarantee the uniqueness (up to the starting point) of the polyline representing the border we require that the following conditions are satisfied for it:

- it has no self-intersections, although may have self-touchings;
- no adjacent vertices of the border coincide;
- no adjacent edges of the border are collinear;
- when traversing the border, its interior is always to the left of its edges.

Input

The input file contains several test cases, each of them as described below.

The first line of each one of the cases contains an integer number n ($3 \leq n \leq 100$) — the number of vertices in the original polyline. Following n lines contain two integer numbers x_i and y_i on a line ($0 \leq x_i, y_i \leq 100$) — coordinates of the vertices. All vertices are different and no vertex lies on an edge between two other vertices. Adjacent edges of the polyline are not collinear.

Output

For each test case, write to the output an integer number m — the number of vertices of the border. Then write m lines with coordinates of the vertices. Coordinates must be precise up to 4 digits after the decimal point.

Sample Input

```
10
4 9
9 9
12 4
10 2
9 5
14 10
14 5
10 9
11 4
4 4
3
70 50
8 93
33 31
```

Sample Output

```
13
9.3333 4
10 2
12 4
10.5 6.5
11.5 7.5
14 5
14 10
11.5 7.5
10 9
10.5 6.5
9 9
4 9
4 4
3
8.0000 93.0000
33.0000 31.0000
70.0000 50.0000
```