

Given any two arbitrary polygons, determine their intersection if it exists.

Input

The input file contains several sets of input.

Each set will consist of two polygon description. Each polygon description begins with a positive integer n corresponding to the number of vertices, followed by n lines with each line containing a pair of integer (x, y) representing the x and y coordinates of a polygon vertex. The vertices will be given in clockwise traversal order and no two polygon edges would overlap. You should terminate your program if $n < 3$. You may assume all integer input is less than or equal to 100.

Output

For each set of input follow the follow the output description below.

If the two convex polygons do not intersect then print out 0. Otherwise, print out the number of intersecting points of the input polygons, followed by the points. The output must begin with the bottom leftmost point and must be listed in lexicographical ordering. Your answers must be rounded up to two digits after the decimal point

Sample Input

```
3
0 0
0 2
2 2
4
5 5
5 10
10 10
10 5
4
1 1
5 1
5 5
1 5
4
3 0
6 3
3 6
0 3
0
```

Sample Output

```
0
8
1.00 2.00
1.00 4.00
2.00 1.00
2.00 5.00
4.00 1.00
4.00 5.00
5.00 2.00
5.00 4.00
```