Line Segment Intersection

The Problem

A metal cutter cuts polygons into a sheet of metal by cutting line segments. Each line segment corresponds to an edge of the polygon. Find the co-ordinates of the corners of the resulting polygon.

The Input

The input consists of several test cases. Each line segment is listed on a line by itself as 4 positive integers: the x and y coordinates of one endpoint followed by the x and y coordinates of the other endpoint. After the last line segment in the test case, there is the character # on a line by itself. After the last test case there is another character # on a line by itself. You are guaranteed that, in each test case, each line segment intersects exactly two other line segments.

The Output

For each test case, output the test case number on a line, the number of corners, and then for each corner a single line with the x and y coordinates, rounded to two decimal places. The corner points should be sorted in increasing order of x coordinates; if multiple points have the same x coordinate, list those points in increasing order of y coordinates.

Sample Input	Sample Output
2 4 4 5 1 6 4 2 8 3 3 5 6 1 7 4 7 2 3 3 # #	Test Case 1: 5 corners 2.36 4.18 3.31 2.92 3.56 4.78 6.38 2.15 6.82 3.47