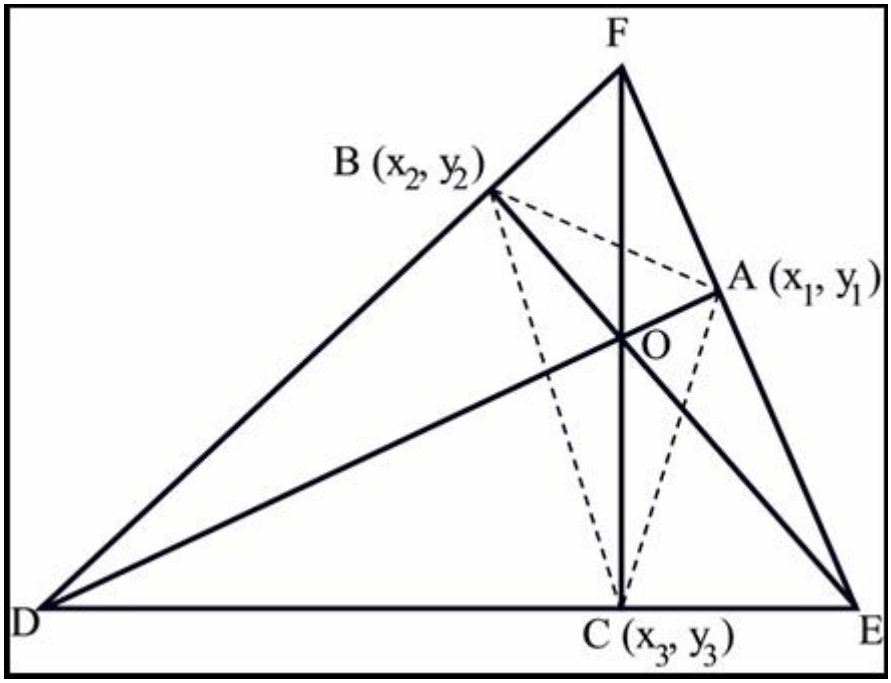
12073 Altitude Triangle

If DEF is an acute triangle and DA, EB and FC are its three heights on EF, DF and DE respectively, then the triangle ABC is called the altitude triangle of triangle DEF. It is well known that DA, EB and FC are concurrent and let us assume that their common point of intersection is O. So point O is called the orthocenter of triangle DEF. It can be proved that O is the in center of triangle ABC. In this problem you will be given the altitude triangle ABC and your job is to find out the corresponding acute triangle DEF.



Input

The input file contains at most 2000 lines of input. Each line contains six integers x_1, y_1, x_2, y_2 and x_3, y_3. These six integers denote an altitude triangle with vertex A (x_1, y_1), B (x_2, y_2) and C (x_3, y_3) respectively. Input is terminated by a case where all six integers are zero. The points A, B and C will not be collinear.

Output

For each line of input produce four lines of outputs. The description of these four lines is given below:

The first line contains the serial of output. Each of the next three lines contains two floating-point numbers, which are actually the coordinate of D, E and F respectively. Note that for a given altitude triangle ABC, there can be four possible triangles DEF. But you are requested only to find the one that is acute. Also note that judge data will be such that precision errors should not occur if you use double precision floating-point numbers. Absolute values of none of the output numbers will be greater than 100000 and all the numbers should have three digits after the decimal point.

Sample Input

```
682 1369 3981 1233 4333 4583
4131 734 1249 4705 2815 475
2815 475 4131 734 1249 4705
0 0 0 0 0 0
```

Sample Output

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Case 1:
6539.582 3443.107
-1528.155 7610.801
1491.578 -917.367
Case 2:
-1810.802 3068.269
3810.093 -82.858
6872.845 7713.274
Case 3:
6872.845 7713.274
-1810.802 3068.269
3810.093 -82.858
```