Suppose that a polygon is represented by a set of integer coordinates,

$$\{(x_0, y_0), (x_1, y_1), (x_2, y_2), \ldots, (x_n, y_n), (x_0, y_0)\}.$$

Please find the convex hull of the polygon, where a convex hull is the minimum bounding convex polygon and "convex" means the angle between two consecutive edges is less than 180^o.

Input

Input consists of several datasets separated by a blank line.

Each dataset contains a sequence of integer coordinates x_i, y_i, one in each line. All input sequence will contain at least 3 different points.

Output

The output for each dataset should contain a sequence of integer coordinates x_i, y_i, specifying the convex hull, each in a line. The first coordinate of the output sequence must be the first coordinate in the input sequence that belongs to the convex hull. The output sequence must be in counter-cockwise order.

Print a blank line between datasets.

Sample Input

```
0, 0
2, 0
1, 1
2, 2
0, 2
0, 0
```

Sample Output

```
0, 0
2, 0
2, 2
0, 2
0, 0
```