L. All-Pair Farthest Points

Given a convex polygon in 2D space, you're to find out the farthest vertex for *each* vertex.

Input

There will be at most 10 test cases in the input. Each test case begins with a single integer n ($3 <= n <= 30{,}000$), the number of points. Each of the following n lines contains two integers x, y ($0 <= x,y <= 10^8$), the coordinates of the vertices, in counter-clockwise order. The last test case is followed by a line with $n=0$, which should not be processed.

Output

For each test case, print n lines, the farthest vertices for each vertex. The vertices in the input are numbered 1 to n. If there are multiple farthest vertex, output the smallest index.

Sample Input

```
3
0 0
1 0
0 10
0
```

Output for Sample Input

```
3
3
2
```