Problem B

Each city in our kingdom has exactly one shop where they sell our favorite icecream. However, occasionally a shop is closed, and in that case we need to head to the nearest other city, instead. Help us prepare for such an emergency by precomputing the nearest city for each of the cities, in the Euclidean distance.

Input and output

The first line contains an integer $n \leq 1\,000\,000$, the number of cities. Each of the next n lines contains two integers x and y ($|x|, |y| \leq 1\,000\,000$), giving the coordinates of the city. No two cities have the same coordinates.

The cities are numbered from 1 to n in order. Output n lines, the i-th containing a single integer, the number of the city nearest to the city i (and different from it). In case of ties, output the nearest city with the smallest number.

Example

Input:

```
3
0 0
2000 0
2000 2000
```

Output:

```
2
1
2
```