


Bacteria

Simulate a 2-dimensional grid petri dish of bacteria. The bacteria in dish live and die by the following rules based on the bacteria surrounding it:

1. Any live bacteria cell with fewer than two live neighbours dies, as if caused by under-population.
2. Any live bacteria cell with two or three live neighbours lives on to the next generation.
3. Any live bacteria cell with more than three live neighbours dies, as if by overcrowding.
4. Any dead bacteria cell with exactly three live neighbours becomes a live bacteria cell, as if by reproduction.

For example if the starting step for the petri dish is the grid on the left the grid on the right would be the petri dish after one generation:

	0	1	2	3	4
0					
1					
2					
3					
4					



	0	1	2	3	4
0					
1					
2					
3					
4					

The programs input is a series of positive integers x,y pairs that indicate the location of live bacteria cells. The input is terminated by $-1,-1$. The output is the x,y locations the live bacteria cells after one generation has completed, terminated by $-1,-1$ - the output able to be used as input for another execution.

Test Cases

Case 1:

Sample Input:

1,2
2,2
3,2
-1,-1

Output for Sample Input:

2,1
2,2
2,3
-1,-1

Case 2

Sample Input:

```
1,2
2,2
3,2
1000000001,1000000002
1000000002,1000000002
1000000003,1000000002
-1,-1
```

Output for Sample Input:

```
2,1
2,2
2,3
1000000002,1000000001
1000000002,1000000002
1000000002,1000000003
-1,-1
```