Problem D. Nice Set of Points

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	256 mebibytes

Consider a set of points. You can move directly between two points if their x-coordinates are the same or their y-coordinates are the same. A set of points is called *nice* if for any two points in the set, the length of the shortest (direct or indirect) path is equal to the manhattan distance between them.

You are given N points. The i-th point is at (x_i, y_i).

You are allowed to add up to $10000 - N$ points. Convert the given set of points into a nice set.

Input

Input Format:

N
x_1 y_1
x_2 y_2
$\vdots$
x_N y_N

Constraints:

- $2 \leq N \leq 1000$
- $1 \leq x_i, y_i \leq 1000$
- The points are pairwise distinct.
- Under these constraints, it is guaranteed that at least one solution exists.
- All values in the input are integers.

Output

Let $M (0 \leq M \leq 10000 - N)$ be the number of added points, and $(s_1, t_1), \ldots, (s_M, t_M)$ be their coordinates. After adding these M points to the set, you get $N + M$ points. **These $N + M$ points must be pairwise distinct**, and this set must be nice. The coordinates must be integers.

Output the answer in the following format.

M
s_1 t_1
s_2 t_2
$\vdots$
s_N t_M

If there are multiple possible solutions, output any.

Examples

standard input	standard output
2 1 1 2 2	1 1 2
4 1 1 2 2 3 4 4 3	4 1 2 3 2 3 3 4 4
7 2 4 3 2 4 6 5 1 6 5 7 3 8 7	15 3 6 8 5 2 2 7 5 2 5 6 6 3 1 5 6 6 2 6 1 7 1 7 2 2 3 6 7 2 6

Note

In Sample 1, if you add $(1, 2)$, you can move between $(1, 1)$ and $(2, 2)$ via $(1, 2)$.