Demarcation

For a long time the island of Bytopia was ruled by the fair king Byteasar. But after the sudden death of the king, his two sons – twins Biteon and Byteon – could not come to an agreement which one of them should ascend the throne. Therefore they decided to divide the island into two provinces to rule them independently.

On a map Byteotia is shaped as a polygon of N vertices. Every side of the polygon is parallel to a side of the map, and every two consecutive sides are perpendicular to each other. Biteon and Byteon want to divide the polygon into two congruent figures, using one line segment contained in the polygon and parallel to a side of the map. (Two figures are congruent if one can be transformed into the other using a combination of reflections, rotations and translations.) Coordinates of the polygon vertices and the end points of the dividing segment are integers.

The king's sons asked you to verify whether such a division is possible.

Task

Given the shape of the island, determine if it can be partitioned by a horizontal or vertical segment into two congruent pieces. If it can, find one such segment.

Input

The first line of the input contains a single integer N, the number of vertices. The ith of the next N lines contains a pair of integer X_i and Y_i, separated by space, which are the coordinates of the ith vertex.

Output

Your program should output a single line. If it is possible to divide the island into congruent parts with a horizontal or vertical segment, which endpoints are (x_1, y_1) and (x_2, y_2), print 4 integers x_1, y_1, x_2 and y_2, separated by spaces. Either $x_1 = y_1$ or $y_1 = y_2$ must hold.

If a suitable division cannot be found, output a single word "`Impossible`" (without quotes).

Examples

Input	Output	Comments
10 0 0 1 0 1 1 3 1 3 5 2 5 2 3 1 3 1 2 0 2	1 2 3 2	This is not the only correct choices of parameters.

Input	Output	Comments
6 0 0 1 0 1 1 2 1 2 2 0 2	Impossible	

Scoring

Subtask 1 (40 points). $4 \leq N \leq 200$

Subtask 2 (10 points). $4 \leq N \leq 5000$

Subtask 3 (50 points). $4 \leq N \leq 100\,000$

Constraints

Time limit: ? s.

Memory limit: 128 MB.