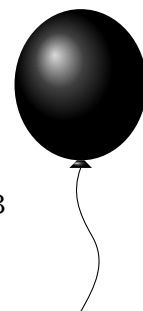


D Cool Rectangles

TIME LIMIT: 2.0s
MEMORY LIMIT: 512MB



You are given several rectangles in the Cartesian plane with sides parallel to the coordinate axes. A *cool rectangle* is a rectangle in the plane such that each of its edges completely lies on the edges of some input rectangles (these edges may overlap). You want to *compress* the input rectangles by shrinking them into cool rectangles (this will happen instantaneously).

To compress an input rectangle into a cool rectangle, the interior of the cool rectangle must be completely contained within the input rectangle. The interiors of the chosen cool rectangles must not overlap (though their edges may touch), and each cool rectangle may compress at most one input rectangle. Determine the smallest total area of cool rectangles required to shrink all the input rectangles, or find that it is impossible.

INPUT

The first line contains an integer n — the number of rectangles ($1 \leq n \leq 30$).

Each of the following n lines contains four integers x_1 , y_1 , x_2 , and y_2 — the coordinates of the opposite corners of rectangles ($-10\,000 \leq x_1 < x_2 \leq 10\,000$; $-10\,000 \leq y_1 < y_2 \leq 10\,000$).

OUTPUT

Print a single integer: the smallest total area of cool rectangles required to shrink all the rectangles. If it's impossible, print -1 .

SAMPLES

Sample input 1	Sample output 1
3 0 0 1 1 1 1 2 2 2 2 3 3	3

Sample input 2	Sample output 2
2 0 0 2 2 1 1 3 3	-1

Sample input 3	Sample output 3
2 1 1 3 4 0 2 4 3	3

Sample input 4	Sample output 4
3 0 0 2 2 1 1 3 3 1 1 2 2	-1

Sample input 5	Sample output 5
4 0 0 1 7 -1 1 2 6 -2 2 3 5 -3 3 4 4	4

Sample input 6	Sample output 6
6 1011 189 2530 1419 -647 -1504 1930 1224 134 1830 620 2476 -2009 -1383 -805 203 875 -319 1821 1982 819 825 1054 2943	2325650