



Building a Fence

Leopold is indeed a lucky fellow. He just won a huge estate in the lottery. The estate contains several grand buildings in addition to the main mansion, in which he intends to live from now on. However, the estate lacks a fence protecting the premises from trespassers, which concerns Leopold to a great extent. He wants to build a fence and, in order to save money, he decides it is sufficient to have a fence that encloses the main mansion, except for one important restriction: the fence must not lie too close to any of the buildings. To be precise, seen from above, each building is enclosed in a surrounding forbidden rectangle within which no part of the fence may lie. The rectangles' sides are parallel to the x- and y-axis. Each part of the fence must also be parallel either to the x-axis or the y-axis.

Help Leopold to compute the minimum length of any allowed fence enclosing the main mansion.

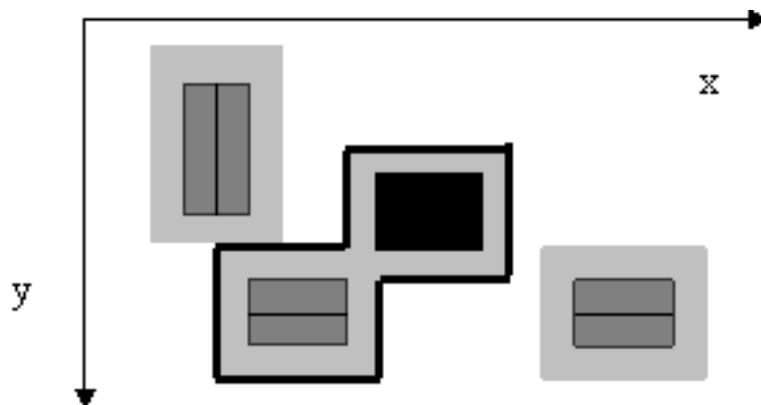


Figure 1: The main mansion (black) and three other buildings with surrounding forbidden rectangles. The thick black line shows a shortest allowed fence enclosing the main mansion.

Input

The input is read from a text file named `fence.in`. The first line of the input file contains a positive integer m ($1 \leq m \leq 100$), the number of buildings of the estate. Then follow m lines each describing a forbidden rectangle enclosing a building. Each row contains four space-separated integers tx , ty , bx , and by , where (tx, ty) are the coordinates of the upper left corner and (bx, by) the coordinates of the bottom right corner of the rectangle. All coordinates obey $0 \leq tx < bx \leq 10,000$ and $0 \leq ty < by \leq 10,000$. The first rectangle is the forbidden rectangle enclosing the main mansion.



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Output

The output is written into a text file named `fence.out`. It contains one line with a single positive integer equal to the minimum length of any allowed fence enclosing the main mansion.

Example

<code>fence.in</code>	<code>fence.out</code>
4 8 4 13 8 2 1 6 7 4 7 9 11 14 7 19 11	32

Grading

In 30% of the testcases $m \leq 10$ holds.