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E. Rectangle Painting 2

time limit per test: 1 second
 memory limit per test: 256 megabytes
 input: standard input
 output: standard output

There is a square grid of size $n \times n$. Some cells are colored in black, all others are colored in white. In one operation you can select some rectangle and color all its cells in white. It costs $\min(h, w)$ to color a rectangle of size $h \times w$. You are to make all cells white for minimum total cost.

The square is large, so we give it to you in a compressed way. The set of black cells is the union of m rectangles.

Input

The first line contains two integers n and m ($1 \leq n \leq 10^9$, $0 \leq m \leq 50$) — the size of the square grid and the number of black rectangles.

Each of the next m lines contains 4 integers $x_{i1} \ y_{i1} \ x_{i2} \ y_{i2}$ ($1 \leq x_{i1} \leq x_{i2} \leq n$, $1 \leq y_{i1} \leq y_{i2} \leq n$) — the coordinates of the bottom-left and the top-right corner cells of the i -th black rectangle.

The rectangles may intersect.

Output

Print a single integer — the minimum total cost of painting the whole square in white.

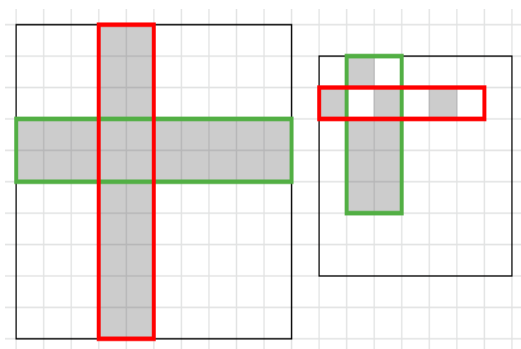
Examples

input	Copy
10 2 4 1 5 10 1 4 10 5	
output	Copy
4	

input	Copy
7 6 2 1 2 1 4 2 4 3 2 5 2 5 2 3 5 3 1 2 1 2 3 2 5 3	
output	Copy
3	

Note

The examples and some of optimal solutions are shown on the pictures below.



Codeforces Round #576 (Div. 1)

[Finished](#)
[Practice](#)


→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

[Start virtual contest](#)

→ Practice

You are registered for practice. You can solve problems unofficially. Results can be found in the contest status and in the bottom of standings.

→ Clone Contest to Mashup

You can clone this contest to a mashup.

[Clone Contest](#)

→ Submit?

 Language: GNU G++11 5.1.0

 Choose file: 选择文件 未选择任何文件

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

[Submit](#)

→ Problem tags

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No tag edit access

→ Contest materials

- Announcement (en)

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