

3 Hide and seek

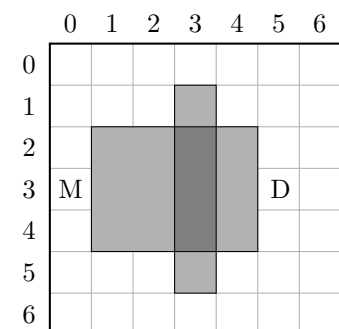
Mabao and Delan are playing hide and seek in a garden of Brobdingnagian proportions with several obstructions such as buildings, lakes, trees, shrubs, landmines, fences, and so on. It is Mabao's turn to find Delan. Unfortunately Delan has forgotten to disable Google Latitude on his smartphone. As a result Mabao knows exactly where he is, and wants to get there as fast as possible.

The garden is a rectangular grid with M rows and N columns, and conveniently each obstruction is a rectangle in this grid. Mabao can move from his current cell one cell up, down, left, or right in one step, as long as he stays within the garden and does not enter any obstruction. Delan does not move at all. You are given both players' initial positions, and the locations of all the obstructions. Find the minimum number of steps needed for Mabao to reach Delan, or report that this is not possible. In the example given below, you can check that the minimum number of steps is 11.

The rows of the garden are numbered from 0 to $M-1$ and the columns from 0 to $N-1$. The initial positions of the players do not fall inside any obstruction.

Input format

- Line 1 : Three integers, M , N , and B . B is the number of obstructions.
- Line 2 : Two integers, the row and column coordinate of Mabao.
- Line 3 : Two integers, the row and column coordinate of Delan.
- Line 4 to $B + 3$: Each line has 4 integers, r_1 c_1 r_2 c_2 , describing an obstruction which spans rows r_1 to r_2 inclusive and columns c_1 to c_2 inclusive. $0 \leq r_1 \leq r_2 < M$ and $0 \leq c_1 \leq c_2 < N$.



Output format

The output consists of a single line with a single integer, the minimum number of steps needed for Mabao to reach Delan, if this is possible, or -1 if Mabao cannot reach Delan.

Test data

- Subtask 1 (20 marks) : $1 \leq M, N \leq 1000$ and $0 \leq B \leq 20$.
- Subtask 2 (50 marks) : $1 \leq M, N \leq 10^9$ and $0 \leq B \leq 20$.
- Subtask 3 (30 marks) : $1 \leq M, N \leq 10^9$ and $0 \leq B \leq 400$.

Sample input

```
7 7 2
3 0
3 5
1 3 5 3
2 1 4 4
```

Sample output

```
11
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Limits

- *Memory limit* : 128 MB
- *Time limit* : 3s