# Task: ZAM
# Castle

**XXIV OI, Stage II, Day two. Source file `zam.*` Available memory: 256 MB.**

A team of treasure hunters obtained a map of castle dungeons with directions to immense treasure. The map is overlaid on a rectangular grid whose vertices have integer coordinates. In particular, the bottom left corner's coordinates are $(0, 0)$ whereas the opposite corner's are $(w, h)$. The whole area of the dungeons is partitioned into $n$ chambers; on the map, each chamber is a rectangle with sides along the grid lines. The rectangles are pairwise disjoint and cover the the map completely. Two chambers are connected with a passage if their sides share a proper segment (sharing merely one point is insufficient).

The treasure hunters begin in one grid point, and the treasure is hidden in another. We want to determine the minimum number of chambers that the treasure hunters have to visit in order to reach the treasure. However, some chambers on the map contain mysterious marks. And though the explorers are not sure what these indicate, they expect the worst (e.g., traps), and thus would like to avoid such chambers.

## Input

The first line of the standard input contains four integers $w$, $h$, $n$, and $m$ ($w, h \geq 2$, $n \geq 1$, $m \geq 0$) that specify the map's (grid's) dimensions, the number of chambers, and the number of marks. In the second line, there is a pair of integers $x_P$ and $y_P$, specifying the point where the treasure hunters begin. Similarly, the third line contains a pair of integers $x_S$ and $y_S$, specifying the treasure's location.

The $n$ lines that follow describe the chambers: The $i$-th one contains four integers $x_1$, $y_1$, $x_2$, $y_2$ indicating that the opposite vertices of the rectangle representing the $i$-th chamber have coordinates $(x_1, y_1)$ and $(x_2, y_2)$.

The next $m$ lines describe the marks: The $i$-th one contains a pair of integers $x$ and $y$ that are the coordinates of the $i$-th mark.

All coordinates are integers that satisfy the following inequalities: $0 \leq x \leq w$, $0 \leq y \leq h$. Moreover, the treasure hunters' initial position, the treasure's location, and every marked point are each *strictly inside* some rectangle representing a chamber.

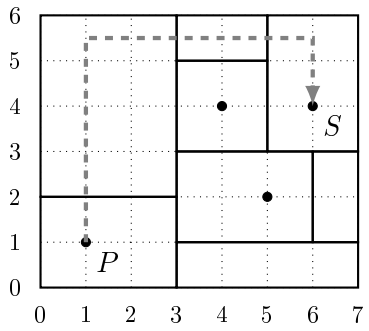
## Output

Exactly one integer should be printed to the standard output: the minimum number of chambers along a route from the point $(x_P, y_P)$ to the point $(x_S, y_S)$ that does not lead through any chamber with a mark. You may assume that such a route always exists.

## Example

For the following input data:

```
7 6 8 2
1 1
6 4
0 0 3 2
3 1 6 3
3 0 7 1
6 1 7 3
0 2 3 6
3 3 5 5
3 5 5 6
5 3 7 6
5 2
4 4
```




the correct answer is:

```
4
```

**Sample grading tests:**

`1ocen:` only one chamber in the dungeon, the answer is 1;

`2ocen:` there are 1 000 000 chambers in a row, none of them marked, the answer is 1 000 000;

`3ocen:` there are $1000 \times 1000$ chambers uniformly distributed in a square, the marks enforce a spiral route.

# Grading

The set of tests consists of the following subsets. Within each subset, there may be several test groups. We let $W = 1\,000\,000\,000$ and $N = 1\,000\,000$.

| Subset | Property | Score |
|---|---|---|
| 1 | $w, h \leq 2000$, $n, m \leq 1000$ | 10 |
| 2 | $w, h \leq 2000$, $n, m \leq N$ | 15 |
| 3 | $w, h \leq W$, $n, m \leq 1000$ | 15 |
| 4 | $w, h \leq W$, $n \leq N$, $m = 0$ | 30 |
| 5 | $w, h \leq W$, $n, m \leq N$ | 30 |