



Light Height

locked

by mclapp

Problem

Submissions

Leaderboard

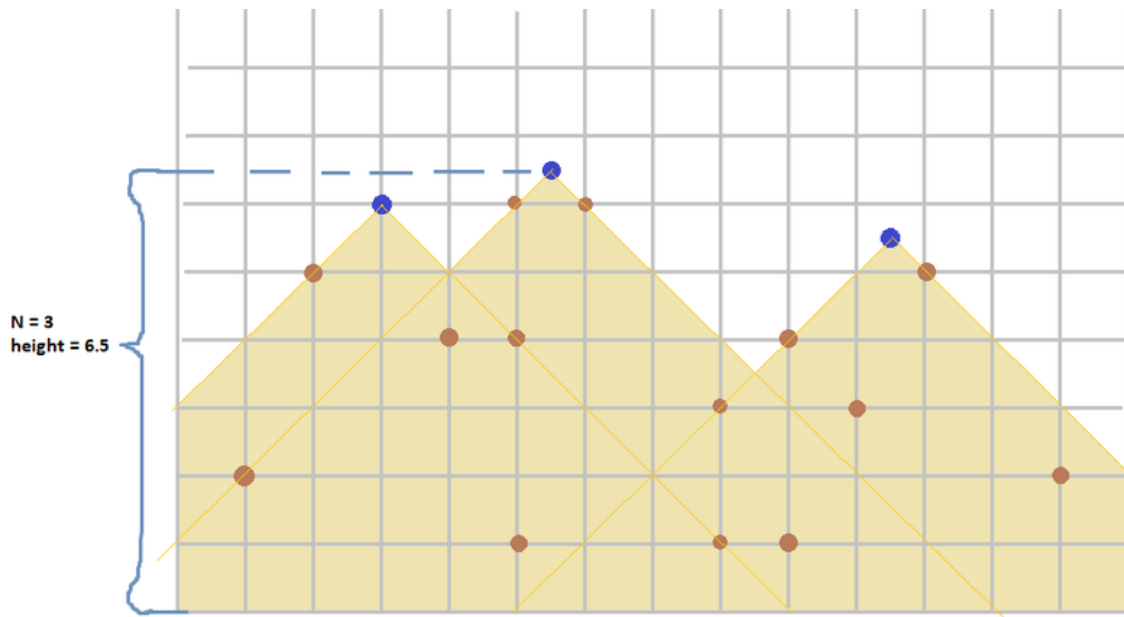
Discussions

The local museum has installed a new art gallery, but there's just one problem: there's no lighting yet! In order to show off all the fancy art, the museum must hang its available lightbulbs as to illuminate all of the objects hanging on the wall. Unfortunately, the funding for this museum has been cut significantly, and it can't afford to purchase any more lightbulbs. The museum can only afford to purchase the ladder that it will use to hang the lightbulbs, and it can only afford the shortest ladder required for the task.

Each object in the exhibit has a specified X and Y position (both integers). The museum's light fixtures, once hung, will each also have a specific X and Y position (not necessarily integers). A light fixture at a given position illuminates all of the area at/below it in a 90-degree-wide diagonal area. For example, a light at (5,5) illuminates any objects placed at (5,5), (4,4), (5,4), (6,4), (3,3), etc.

Given the positions of all of the objects on the museum's wall, your goal is to compute an optimal arrangement of the light fixtures, meaning that no other arrangement of lights requires a shorter ladder to hang up. The height of the required ladder is simply the Y position of the highest light. How tall does the ladder need to be?

The below image demonstrates the first test case. It is impossible to illuminate all 14 objects with only 3 lights without having at least one light with a y-position of 6.5 or greater. Therefore, the solution to this testcase is "6.5".



Perhaps you shall find the answer... illuminating.

Input Format

The first line of input is an integer 'N', which is the number of light fixtures that the museum owns.

The second line of input is an integer 'O', which is the number of objects on the wall.

The following 'O' lines each contain the position of a single object in the form "x y" where X and Y are both integers, separated by a space, with each line terminated by a newline.

Constraints

$$1 < N < 200000$$

$$1 < O < 200000$$

$$0 < x < 2^{19}$$

$$0 < y < 2^{19}$$

Output Format

The output is a single number 'H' which is the height of the shortest ladder required to hang the 'N' lights to illuminate all 'O' objects. If the number is an integer, it should end in ".0", but if it is a half-integer, it should end in ".5".

Sample Input 0

```
3
14
1 2
2 5
4 4
5 1
5 4
5 6
6 6
8 1
8 3
9 1
9 4
10 3
11 5
13 2
```

Sample Output 0

```
6.5
```

Sample Input 1

```
1
10
1910 100
1737 179
282 167
1965 178
704 181
404 124
1424 158
611 55
977 23
1960 91
```

Sample Output 1

```
1014.0
```



Submissions: [2](#)

Max Score: 90



Difficulty: Medium

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BASH

1

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Run Code

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