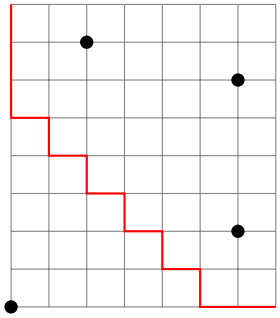
Proper social distancing

In some, less fortunate, parts of the world, social-distancing norms still need to be observed. A pedestrian wishes to walk from the northwest corner of a large gridded network of walkways to the southeast corner. There are people seated at benches at some of the intersection points. To show proper social responsibility, the pedestrian wants to keep as far away from the other people. That is, they aim to find a path whose minimum distance from a seated person is as large as possible (the distance between two points in the grid is the sum of their horizontal and vertical separations).

In a further fit of kindness, they also want to ensure that, subject to meeting the first criterion, the *total* distance between the path and the seated people (i.e., the sum of the minimum distances to each seated person) should be as large as possible.

Example

In the grid below seated people are marked with dots, and a (not necessarily unique) best path is drawn in red. This is justified as follows – clearly the upper left sitter and lower right sitter mean the best minimum distance is 2 (and that distance is forced for those two points). The maximum distance we could have for the upper right sitter is 6 since we have to cross their horizontal line somewhere. The first two steps are forced, so the best possible for the lower left sitter is also 6 - but the third step must reduce the distance to either the upper right or lower left by 1. Choosing a down step, the pedestrian can then succeed in keeping their distance from those two points by the zig zag pattern.



Task

Write a program to find the optimum minimum distance, and also the optimum total distance for that minimum in a sequence of scenarios contained in an input file read in from `stdin`.

Input format

- Each scenario begins with a line containing the number of horizontal walkways and the number of vertical walkways.
- Each additional line of a scenario describes the locations of the seated people in row-column order (with the upper left at `0 0`), increasing from top to bottom and from left to right.
- Each scenario is separated from the next by a blank line.

You may assume that there are at most 100 vertical and 100 horizontal walkways, and at most 500 seated people in a scenario.

The scenario corresponding to the example above would be:

```
9 8
8 0
1 2
2 6
6 6
```

Output format

For each scenario print (to `stdout`) a line of the following form:

```
min M, total T
```

where `M` and `T` are the largest possible minimum distance achievable and the largest possible total distance achievable for the minimum. So, the output for the scenario above should be

```
min 2, total 15
```

Relates to Objectives

1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.4, 26., 2.7, 2.10, 3.3, 3.4, 3.5, 3.6, 4.1, 4.2, 4.3.

(Group)