7200 Trampolines

You are being chased by police after repossessing a laser for a nefarious doomsday device. To escape, you need to cross a field of trampolines. Fortunately for you, the trampolines are arranged in a regular grid, but unfortunately they are placed on platforms of different heights.

Your task is to find the smallest number of jumps required to cross the field, entering at the northwest corner and exiting at the south-east corner. The height of each trampoline is given in metres, as illustrated in Figure 1.

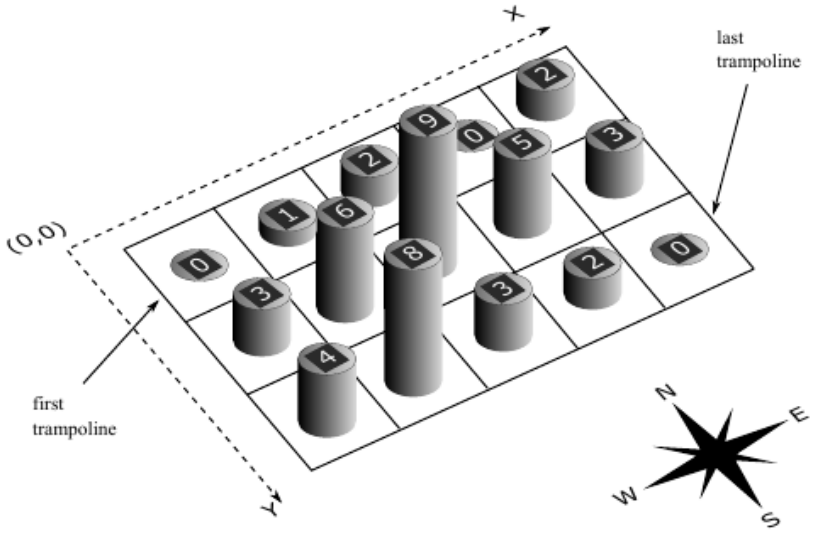

Figure 1: A grid of trampolines. The trampolines are supported on platforms of varying height.

When you drop onto a trampoline, you can use your knees to exert some control over the height of your next jump. The high-point of your next jump can be up to 1 m higher or lower than your previous one, provided that you rise at least 1 m and no more than 4 m from the trampoline. You must also ensure that the high-point of your jump is at least 1 m above the trampoline on which you will land (so that you can bounce), but no more than 5 m (otherwise you will break a leg).

You also have some horizontal control. You can always land on the same trampoline from which you took off: call this a "non-moving" jump. You can also jump from a trampoline to a neighbouring one (north, south, east or west) — a "moving" jump. However, you can only do two moving jumps in a row if they are in the same direction; you need a non-moving jump to change direction.

It is also possible to make a double jump, where you skip over a trampoline. This can be done under the following conditions (in addition to those already mentioned):

- The jumped-from and jumped-to trampolines must have the same height.
- The trampoline in between must be at the same height or lower than the other two trampolines.
- The previous jump must be a moving jump, in the same direction as the double jump (double jumps are also moving jumps).

Your first jump is a moving jump onto the north-western trampoline, dropping 1 m onto it, from either the north or west (your choice). Your final jump is a moving jump off the south-eastern trampoline, rising 1 m from it, either to the south or east (again, your choice).

It is guaranteed that it will be possible to cross the field in all test cases.

To illustrate, the following is a solution to the grid shown in Figure 1. Coordinates represent trampolines, from (0, 0) to (4, 2), and heights represent the height of the top of each jump: – 1 m – (0, 0) – 2 m – (1, 0) – 3 m – (2, 0) – 3 m – (4, 0) – 4 m – (4, 0) – 4 m – (4, 1) – 4 m – (4, 2) – 3 m – (4, 2) – 2 m – (4, 2) – 1 m – .

Input

The input consists of an arbitrary number of records, but no more than 20. Each record starts with a line containing integers X and Y, $3 \leq X, Y \leq 100$, the width and height of the field. This is followed by Y lines of X space-separated integers, giving the heights of the trampolines in metres. The lines run north to south and each line runs west to east. All heights are in the range 0 – 999, inclusive.

Input is terminated by a line containing only '`-1`'.

Output

For each record output the minimum possible number of jumps required to cross the field, including the jumps to get onto the first trampoline and off of the last and back onto solid ground.

Sample Input

```
5 3
0 1 2 0 2
3 6 9 5 3
4 8 3 2 0
5 5
0 2 3 0 3
1 2 3 4 5
2 2 3 4 6
1 4 4 5 0
2 3 3 1 0
-1
```

Sample Output

```
10
11
```