Find the Treasure (islands)

Giorgio and Luca, while looking through old stuff in the basement of the OIS mansion, found a treasure map! However, the map has faded and is now impossible to understand the exact location of the hidden treasure. The map M can be represented as a two-dimensional grid with R rows and C columns, where each cell can either be land or sea. In particular, for the cell on the i-th row and j-th column, $M[i][j] = 1$ if the cell represents a portion of land, otherwise $M[i][j] = 0$ if it is part of the sea.

Figure 1: Edoardo's treasure map partially recovered with advanced techniques.

They want to find the treasure at all costs and are ready to start a trip to visit all islands on the map. An island I can be defined as a maximal (i.e., the largest possible) set of *land* cells, such that:

- For every pair of land cells of I, it is possible to move from one cell to the other by only moving between side-adjacent cells of I;
- No land cell of I is on the border of the map (first or last row or column): those are just *peninsulas*, there's no point in wasting time on them.

Help Luca and Giorgio find the number of islands present in the map!

> ☞ Among the attachments of this task you may find a template file `islands.*` with a sample incomplete implementation.

Input

The first line contains two integers R and C, the number of rows and columns. Then R lines follow, each containing C values describing a row of the map. The j-th value of the i-th line represents $M[i][j]$, which is equal to 1 if the cell on the i-th row and j-th column is a portion of land, 0 otherwise.

Output

You need to write a single line with an integer: the number of islands present in the map.

Constraints

- $1 \leq R, C \leq 1\,000$.
- $M[i][j]$ is equal to zero or one, for each $i = 0 \ldots R-1, j = 0 \ldots C-1$.

Scoring

Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases.

– **Subtask 1** (0 points) Examples.
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– **Subtask 2** (10 points) $R, C \leq 3$.
●●○○○

– **Subtask 3** (15 points) $R = 3$.
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– **Subtask 4** (15 points) $C = 3$.
●●○○○

– **Subtask 5** (20 points) There exist no two land cells which are side-adjacent.
●●○○○

– **Subtask 6** (25 points) No land cell is on the border of the map.
●●●○○

– **Subtask 7** (15 points) No additional limitations.
●●●○○

Examples

input	output

4 4
0 0 0 0
0 1 0 0
0 0 1 1
0 0 1 1
	1

6 6
0 0 0 0 0 0
0 1 0 0 1 0
0 1 1 0 1 0
0 1 0 0 0 0
0 0 0 1 0 0
0 0 0 0 0 0
	3

7 7
0 0 0 0 0 0 0
0 1 1 1 1 1 0
0 1 0 0 0 1 0
0 1 0 1 0 1 0
0 1 0 0 0 1 0
0 1 1 1 1 1 0
0 0 0 0 0 0 0
	2

Explanation

In the **first sample case**, there is one island formed by the land cell in position $(1,1)$. The set of connected land cells in position $(2,2)$, $(2,3)$, $(3,2)$ and $(3,3)$ is not an island since at least one of those land cells is placed on the border.

In the **second sample case**, there are three islands. The first island is composed of the cells in position $(1,1)$, $(2,1)$, $(3,1)$ and $(2,2)$. The second island is composed of land cells $(1,4)$ and $(2,4)$. The third island is composed only of a single land cell in position $(4,3)$.

In the **third sample case**, there are two islands, one “inside” the other.