Object Collision in a Falling Grid

Background

In the video game Sirtet, the playing area consists of a rectangular grid with N rows and M columns. Each cell in the grid is either blank (denoted as .) or filled (denoted as #). Filled cells that are adjacent either horizontally or vertically belong to the same rigid object.

Before the game starts, the grid is initialized with some cells filled. Once the game begins, all objects fall straight down at the same speed until one of the following conditions is met:

1. The object reaches the bottom row of the grid.
2. The object lands directly on top of another object.

The goal is to determine the final state of the grid after all objects have fallen.

Input Specification

The input consists of:

1. A line containing two space-separated positive integers, N and M, where N * M <= 10^6.
2. The next N lines each contain M characters ('.' or '#'), representing the initial state of the grid.

For some subsets of the problem:

- For 10 of the 25 marks, N * M <= 2000.
- For an additional 6 of the 25 marks, M = 2.

Output Specification

Output the final state of the grid after all objects have fallen. The output should consist of N lines, each containing M characters ('.' or '#').

Example

Input:

5 4

..#.

##.#

.##.

#...

#...

Output:

....

....

###.

###.

#..#