ATTENTION! ATTENTION! ATTENTION!

Unexpectedly, a massive fire broke out in the premises of the Faculty of Computing (in Minecraft) between the start of the IOI and now. The committee did not want to interrupt the competition and disrupt the participants, so we decided to inform you through this task. If you want to help us save the Faculty of Computing (RAF) and, in the process, earn some extra points in the IOI, please continue reading!

In total, there are eight rooms currently on fire. Each room can be imagined as an M×N matrix, where some cells are passable, and the rest are walls. The fire is currently burning on all passable cells. The committee has acquired an immense supply of water through somewhat illegal methods (in Minecraft). You can use one liter of water to flood one passable cell. However, since all of this is happening in Minecraft (yes, in Minecraft, definitely in Minecraft), if a passable cell is adjacent to two flooded cells, it also becomes flooded. Two cells are adjacent if they share a side.

To extinguish all the fire, you need to use a few liters of water so that all passable cells are flooded. Since the committee doesn't want to use too much of its (illegally acquired) water and risk getting caught by the police (in Minecraft), we kindly ask you to use as little water as possible to solve this task. You have until the end of the competition to solve this task and prevent us all from burning (in reality, in Minecraft).

Note

This is an output-only task. You are given input files (`1.in`, `2.in`, `3.in`, `4.in`, `5.in`, `6.in`, `7.in`, `8.in`), and you should only send the corresponding output files (`1.out`, `2.out`, `3.out`, `4.out`, `5.out`, `6.out`, `7.out`, `8.out`). You are also provided with images showing the appearance of each input file (`1.png`, `2.png`, `3.png`, `4.png`, `5.png`, `6.png`, `7.png`, `8.png`).

Input Description

The first line of the standard input contains two integers, N and M, the dimensions of the matrix. Then, in each of the next N lines, there is a string of length M indicating whether a cell is passable (`.`) or a wall (`#`).

Output Description

The first line should contain the number L of liters of water you plan to use to extinguish the fire. Let's assign the number $M \cdot (x - 1) + y$ to the cell (x, y). A helper array A is formed, where $A[0] = 0$, and $A[1], A[2], ..., A[L]$ are the numbers assigned to the cells you want to flood. The second line of the output contains L numbers, each representing the difference between consecutive numbers in the array A ($A[1] - A[0]$, $A[2] - A[1]$, ..., $A[L] - A[L - 1]$).

However, the zipped archive provided with this task also includes `compressor.cpp`, which provides an alternative format (probably easier for participants to write, but impractical due to the size of certain solutions) that can be converted to the requested format.

The first line should contain the number L of liters of water you plan to use to extinguish the fire. Then, in each of the next L

lines, two integers representing the row and column indices (indexed from 1) of the cells you flood with the corresponding liter of water.

Example

Input

```
3 3
#.#
.##
...
```

Output

```
4
2 2
4 1
```

Explanation

The flooded cells in the given output are $(1, 2)$, $(2, 1)$, $(3, 2)$, and $(3, 3)$ (assigned numbers 2, 4, 8, and 9, respectively, with differences $2 - 0 = 2$, $4 - 2 = 2$, $8 - 4 = 4$, and $9 - 8 = 1$). After flooding the cells described in the task, the only cell we didn't flood manually is $(3, 1)$. However, it becomes flooded because it is adjacent to two flooded cells ($(2, 1)$ and $(3, 2)$).

Constraints

- $1 \leq N, M \leq 3000$

Scoring

The provided archive for this task contains a file describing the scoring for each example. The first line states the total number of points P for that task, followed by P numbers on the next line, where the i-th number represents the maximum number of liters of water you can use if you want to achieve i points.

Example	N, M	Points
1	10	6
2	600	6
3	20	12
4	700	12
5	100	16
6	300	16
7	3000	16
8	1000	16

Should be swapped!