



Winter Camp Contest 2023

Problem J

Jewelry Box

Time limit: 1 second

Memory limit: 2048 megabytes

Problem Description

Jen has a jewelry box with n rows and m columns. The rows are numbered from 1 to n from top to bottom, and the columns are numbered from 1 to m from left to right. Each cell is identified by a pair (x, y) , which means it is located in the x -th row and the y -th column.

There are some jewels located in some cells of the box. Each cell contains, at most, one jewel. Surprisingly, no two jewels are located in adjacent cells. In this problem, two cells are considered adjacent if they share an edge.

For some reason, Jen would like to form some pairs of jewels. Each pair of jewels must be connected by a strand of rope, which may occupy some other cells of the jewelry box. More formally, suppose a strand of rope connects jewels located in (a_1, b_1) and (a_k, b_k) , and then the rope can be viewed as a sequence of k cells $(a_1, b_1), (a_2, b_2), \dots, (a_k, b_k)$. Each pair of consecutive cells in the sequence must be adjacent, and all the k cells should be distinct. Due to aesthetics, no jewels should be attached to more than one rope, and no two ropes should occupy the same cell.



Winter Camp Contest 2023

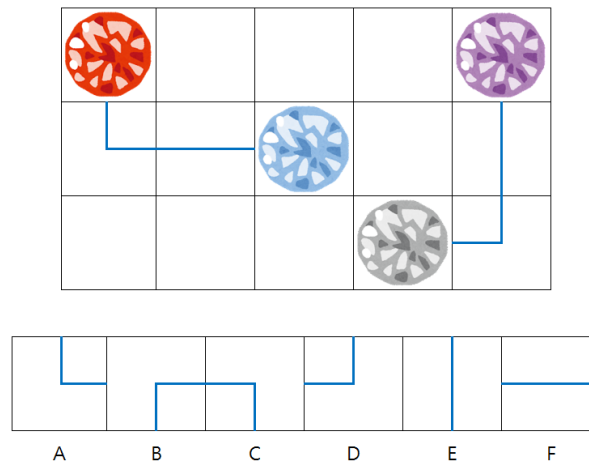


Figure 1: A valid configuration of jewels and ropes. There are 2 pairs of jewels in the figure: One pair is $(1, 1), (2, 3)$, and the other is $(1, 5), (3, 4)$.

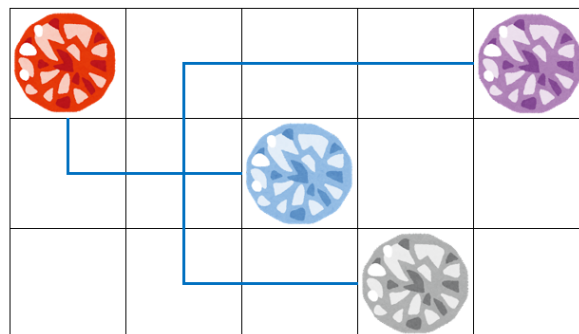


Figure 2: An invalid configuration of jewels and ropes because the two ropes share a common cell.

Jen hopes to form as many pairs of jewels as possible. She also wonders about a way to place these strands of ropes. Can you help her out?

Input Format

The first line of the input contains an integer T , denoting the number of test cases.

The first line of each test case consists of two integers n, m . Each of the following n lines contains m characters. For each $i = 1, 2, \dots, n$, the j -th character denotes whether there is a jewel in cell (i, j) for $j = 1, 2, \dots, m$. # denotes a cell containing a jewel, while . denotes a cell not containing a jewel. It is guaranteed that no two jewels are adjacent.



Output Format

For each test case, print n lines containing m characters denoting the configuration of the jewels and the ropes. The jewel pairs should be as many as possible.

Each character should be one of the following:

- `#` denotes a cell with jewels. The locations of the jewels should be the same as those in the input.
- Any of `ABCDEF` denotes a cell with ropes. Refer to the figure in the problem description to know the meaning for each character. In formal:
 - `A` denotes a cell connecting the cell to the top and to the right.
 - `B` denotes a cell connecting the cell to the bottom and to the right.
 - `C` denotes a cell connecting the cell to the bottom and to the left.
 - `D` denotes a cell connecting the cell to the top and to the left.
 - `E` denotes a cell connecting the cell to the top and to the bottom.
 - `F` denotes a cell connecting the cell to the left and to the right.
- `.` denotes a cell with nothing.

Technical Specification

- $1 \leq T \leq 10$
- $1 \leq n, m \leq 100$

Sample Input 1

```
2
2 2
# .
. #
3 4
# . . #
. . # .
# . . #
```



Winter Camp Contest 2023

Sample Output 1

```
#C
.#
#FF#
BF#.
#..#
```