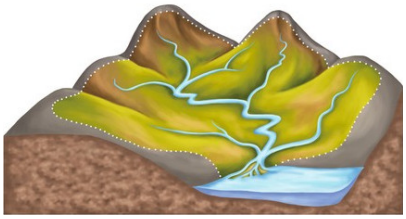
PROBLEM I — WATERSHEDS — 30 POINTS



Geologists sometimes divide an area of land into different regions based on where rainfall flows down to. These regions are called *drainage basins*.

Given an elevation map (a 2-dimensional array of altitudes), label the map such that locations in the same drainage basin have the same label, subject to the following rules.

- From each cell, water flows down to at most one of its 4 neighbouring cells.
- For each cell, if none of its 4 neighbouring cells has a lower altitude than the current cell's, then the water does not flow, and the current cell is called a *sink*.
- Otherwise, water flows from the current cell to the neighbour with the lowest altitude.
- In case of a tie, water will choose the first direction with the lowest altitude from this list: North, West, East, South.

Every cell that drains directly or indirectly to the same sink is part of the same drainage basin. Each basin is labelled by a unique lower-case letter, in such a way that, when the rows of the map are concatenated from top to bottom, the resulting string is lexicographically smallest (in particular, the basin of the most North-Western cell is always labelled 'a'). Note that neighbouring sinks are not considered to be in the same drainage basin.

Input

The first line of the input contains two integers – H and W – the height and width of the map, in cells ($1 \le H, W \le 100$). The next H lines will each contain a row of the map, from north to south, each containing W integers, from west to east, specifying the altitudes of the cells ($0 \le altitudes < 10{,}000$). It is guaranteed that there will be at most 26 basins.

Output

Output H lines that list the basin labels for each of the cells, in the same order as they appear in the input.

Turn over for sample input and output.

Sample Input 1

```
3 3
9 6 3
5 9 6
3 5 9
```

Output for Sample Input 1

```
a b b
a a b
a a a
```

Explanation of Sample 1

The upper-right and lower-left corners are sinks. Water from the diagonal flows towards the lower-left because of the lower altitude (5 versus 6).

Sample Input 2

```
1 10
0 1 2 3 4 5 6 7 8 7
```

Output for Sample Input 3

```
a a a a a a a a a b
```

Sample Input 3

```
2 3
7 6 7
7 6 7
```

Output for Sample Input 3

```
a a a
b b b
```

Sample Input 4

```
5 5
1 2 3 4 5
2 9 3 9 6
3 3 0 8 7
4 9 8 9 8
5 6 7 8 9
```

Output for Sample Input 4

```
a a a a a
a a b b a
a b b b a
a b b b a
a a a a a
```