

2121 Maze Checking and Visualization

A program is needed to assist in checking and visualizing the mazes for problem 3. In that problem, the input consists of a sequence of maze descriptions. The mazes are rectangular, and consist of a number of square cells. Some of the sides of these cells are solid, and other sides are open.

To be consistent, an open side in one cell must correspond to an open side on the adjacent neighboring cell. The maze characteristics also require that there be only two entry points to the maze, one on the left side of upper left cell in the maze, and one on the right side of the lower right cell in the maze.

These maze characteristics can be easily verified if a visual representation of the maze is available. To prepare such a representation, each cell in the maze is approximately displayed using plus signs at the corners of cells, three hyphens (or minus signs) for a solid top or bottom side, and a single vertical stroke for a solid left or right side. An appropriate number of blanks should be used for any open sides of a cell. If a side shared by two cells is inconsistent (solid in one cell and open in the other), then print three lower-case x's in place of the three hyphens if a top or bottom side is inconsistent, or a single upper case 'X' in place of the vertical stroke if a left or right side is inconsistent.

A cell with solid sides is shown on the left below. To its right a two row, two-column maze is shown. This maze has an open side to the left of the upper left cell and to the right of the lower right cell. The visualization also shows an inconsistency between the right side of the upper left cell and the left side of the upper right cell, and an inconsistency between the lower side of the upper right cell and the upper side of the lower right cell.

```

+----+
|  |
+----+

+----+----+
|      X  |
+  +xxx+
|  |
+----+----+

```

Display a visual representation of each maze in the input data.

Input

The input data will contain descriptions of multiple mazes. The description of each maze begins with integers giving the number of rows (NR) and number of columns (NC) in the maze. Neither NR nor NC will be larger than 20. Following these integers there will appear $NR * NC$ hexadecimal digits, corresponding to the cells in the maze in row-major order. Blanks and end of line characters may be included at arbitrary places for readability. Hexadecimal digits include the decimal digits '0' through '9' (representing themselves), and the upper case letters 'A' through 'F' (representing the values 10 through 15 respectively). Each hexadecimal digit identifies the open sides of the corresponding cell in the maze, as follows. Each side of a cell has an associated number: top = 1, right = 2, bottom = 4, and left = 8. If the numbers corresponding to the open sides of a cell are totaled, they yield the corresponding hexadecimal digit that will appear in the input for that cell. For example, a cell that has only its left and right sides open would be specified in the input as the hexadecimal digit 'A', since 8 (left) + 2 (right) = 10 . A cell with its right, bottom, and left sides open would be specified in the input as the hexadecimal digit 'E', since the value of 'E' is 14, or 2 (right) + 4 (bottom) + 8 (left).

A pair of zeroes follows the data for the last case.

Output

The output for each maze will begin with identification of the maze number. Mazes are numbered sequentially starting with 1. Following this identification there should be a single blank line and the visualization of the maze as previously described. The maze should be displayed starting in column one of each output line. A blank line should follow each maze.

Sample Input

```
4 3 A C 4 4 7 D 7 D 1 1 3 A
3 7 C 4 2 E A E C 5 3 E 9 6 9 1 3 A B 8 3 A A
5 4 A E C 4 4 5 1 5 3 B A D 6 C 6 9 1 3 B A
0 0
```

Sample Output

Maze 1:

```
+---+---+---+
      |  |
+---+  +  +
|  |  |
+  +xxx+  +
|      X  |
+  +  +xxx+
|  |
+---+---+---+
```

Maze 2:

```
+---+---+---+---+---+---+
      |  |  X  |
+  +  +---+xxx+---+  +  +
|  |  |  |  |  |
+  +---+  +---+  +---+---+
|  |  |
+---+---+---+---+---+---+
```

Maze 3:

```
+---+---+---+---+
      |  |
+---+  +  +  +
|  |  |  |  |
+xxx+  +---+  +
|  |
+---+---+---+  +
|  |  |
+  +  +  +---+
|  |
+---+---+---+---+
```