

Fun House

by James Feher

A “fun house” is a popular attraction that includes a room of mirrors. A good visual effect you want to obtain in this rooms is that, when looking forward from the entry door, the exit door appears to be directly ahead. However, the room has double-sided mirrors placed throughout at 45 degree angles. So, the exit door can be on any of the walls of the room. The set designer always places the entry and mirrors, but can never seem to be bothered to place the exit door. One of your jobs as part of the construction crew is to determine the placement of the exit door for the room given an original design.

The final diagram for a sample room is given below. The asterisk (*) marks the entry way, lower case x's mark the walls, the mirrors are given by the forward and backward slash characters (/ and \), open spaces with no visual obstructions are marked by periods (.), and the desired placement of the exit is marked with an ampersand (&). In the input diagram, there is an 'x' in place of the '&', since the exit has not yet been located. You need to alter the input diagram by replacing the proper 'x' with an '&' to identify the exit. Note that entrances and exits can appear on any of the walls (although never a corner), and that it is physically impossible for the exit to be the same as the entrance. (You don't need to understand why this is so, although it may be fun to think about.)

```
xxxxxxxxxxx
x../..\...x
x.../....x
*../.....x
x.....x
xxxxxx&xxxx
```

Input

The input is composed of T test cases ($1 \leq T \leq 40$), each representing one room. Each room will be preceded by two integers, W and L , where $5 \leq W \leq 50$ is the width of the room including the border walls and $5 \leq L \leq 50$ is the length of the room including the border walls. Following the specification of W and L are L additional lines containing the room diagram, with each line having W characters from the alphabet $\{*, x, ., /, \backslash\}$. The perimeter will always be comprised of walls, except for one asterisk (*) which marks the entrance; the exit is not (yet) marked. A line with two zeros indicates the end of input data.

Output

For each test case, the first line will contain the word 'HOUSE' followed by a space and then an integer that identifies the given fun house sequentially. Following that should be a room diagram which includes the proper placement of the exit door, as marked by an ampersand (&).

Sample input 1

```
11 6
xxxxxxxxxxxx
x../..\...x
x.../....x
*../.....x
x.....x
xxxxxxxxxxxx
5 5
xxxxx
*...x
x...x
x...x
xxxxx
0 0
```

Sample output 1

```
HOUSE 1
xxxxxxxxxxxx
x../..\...x
x.../....x
*../.....x
x.....x
xxxxxxx&xxxx
HOUSE 2
xxxxx
*...&
x...x
x...x
xxxxx
```

Limits

Time limit is 3 second.

Memory limit is 256 megabytes.