The Unibaker

problem 30

29 points

The newest fad for party cakes is the cupcake-cake, where many cupcakes are placed side-by-side to make a single cake. The celebrated Unibaker has developed his own version. All of his cupcakes are either White or Chocolate cake.

- and they are square,
- and they are placed together to create a larger square cake,
- with specific requirements:

The White and Chocolate cupcakes each form a shape called a Nurikabe, which means:

- No 2x2 set of cupcakes can all be the same type
- All cupcakes of the same type must be connected by neighboring sides. This creates 2 fully-connected regions: one White, one Chocolate
- No loops are formed. So, at least one of each type is on the border of the full cake.

Note: The number of White and Chocolate cupcakes does not have to be equal.

Input

The first line of input is a single integer N (max of 11), the size of the square cake. The next N lines contain N characters, each reprenting:

- '.' - a period or White cupcakes
- '#' - a hash for Chocolate cupcakes
- '?' - a question mark for Unknown cupcakes

You must determine all the cupcakes and print the diagram for the full cake. There is only one solution.

Example 1

```
4
???#
?.#?
?.??
..?.
```

Example 2

```
7
??.????
????.??
?##?.??
..?#?#?
?.?####
???.???
?#???#?
```

Output

Output the fully defined grid showing the 2 Nurikabe regions for White (.) and Chocoloate (#) cupcakes.

Output 1

```
####
#.#.
#.#.
....
```

Output 2

```
.......
.#.#.#.
.###.#.
...#.#.
#.#####
#.....#
#######
```