Given a chessboard $N \times N$, on which the rooks are placed. You have to color those rooks in a minimal number of colors in that way no horizontal and vertical line contains two rooks of the same color.

Input

First line of the input file contains an integer S $(0 < S < 10)$ that indicates how many sets of inputs are there. The description of each set is given below:

The first line of each input set contains number N $(0 \leq N \leq 100)$.

The next N lines contain a chessboard (array $N \times N$), where an empty cell is marked as '`.`', and a cell that contains a rook is marked as '`*`' (there are not blanks between the symbols in a line).

Output

The description of output for each test case is given below:

The first line of the output for each test case contains number M – the minimal number of colors. The next N lines contain a chessboard, where an empty cell is marked as '`0`', and a cell that contains a rook is marked as 'K', where K is a color of the rook. There can be more than correct solution any valid solution will be accepted.

Sample Input

```
2
2
*.
**
4
*.*.
*.*.
***.
..**
```

Sample Output

```
2
2 0
1 2
4
1 0 2 0
3 0 1 0
2 1 3 0
0 0 4 1
```