Problem G. Game MPO

Time limit: 2 seconds
Memory limit: 1024 megabytes

In the board game MPO you earn points by building structures on the cells of an $n \times n$ square board. You are given the initial state of the board, where each cell is described by one of the 7 characters: "`.mpoMPO`":

- Uppercase letters `M`, `P`, `O` denote cells with built structures: metropolis, park, or ocean, respectively.
- Lowercase letters `m`, `p`, `o` denote empty cells where metropolis, park, or ocean, respectively, can be built.
- A dot '`.`' denotes an empty cell where no structure can be built.

You gain 1 point for each structure, and 1 point for each pair of adjacent (by side or corner) metropolis-park structures, or ocean-ocean structures. A *move* is building a structure on a permitted cell, which means changing a lowercase letter to its corresponding uppercase letter: `m` $\rightarrow$ `M`, `p` $\rightarrow$ `P`, or `o` $\rightarrow$ `O`. **It is forbidden to make a move that earns only one point** (that is, a move that increases the score by exactly 1).

Your strategy is simple. You always make one of the moves that earns most points. You stop playing when you cannot make a legal move – when no possible move earns at least 2 points.

Your task is to determine the initial and final score, as well as the final board state. It can be proven that the final state does not depend on how we resolve ties between moves that earn the same number of points.

Input

The first line contains an integer n ($2 \le n \le 10$) denoting the size of the board.

The next n lines describe the initial board. Each line contains a string consisting of n characters "`.mpoMPO`".

Output

In the first line output two integers – the initial score and the final score.

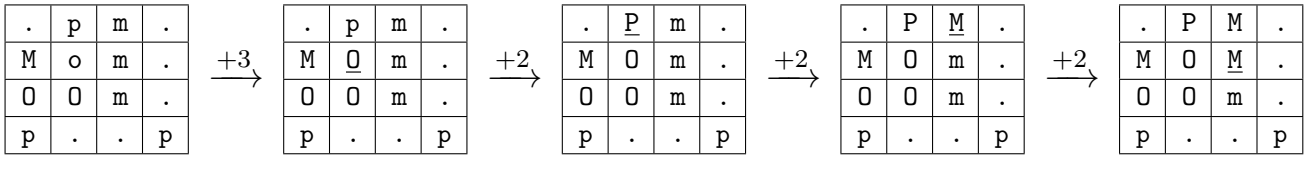
The following n lines should describe the final board in the same format as in the input.

Example

standard input	standard output
4 .pm. Mom. OOm. p..p	4 13 .PM. MOM. OOm. p..p

Note

The initial board has 3 structures (one metropolis and two oceans) and there is one pair of adjacent oceans, resulting in a total score of 4.



- First move: build an ocean, earning 3 points (1 for the new structure and 2 for the two new pairs of adjacent oceans).
- Second move: build a park, earning 2 points (1 for the new structure and 1 for a new metropolis-park pair).
- Third and fourth moves (in any order): build two new metropolises, each earning you 2 points.

At the end, there are three remaining cells where structures could be built, but a move on any of them would earn you only 1 point. The game ends with a total score of 13 points (7 structures, 3 metropolis-park pairs, 3 ocean-ocean pairs).