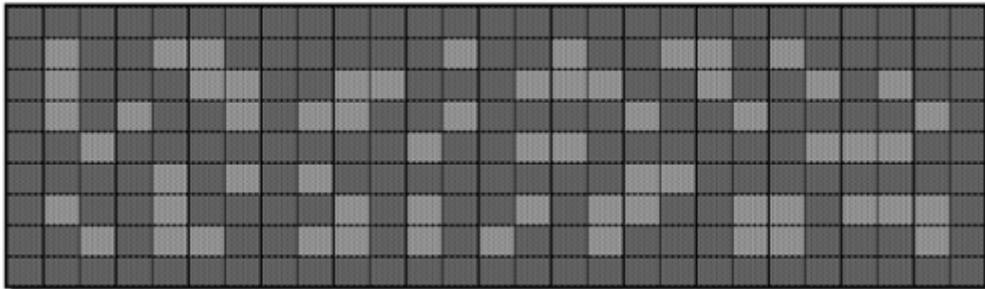


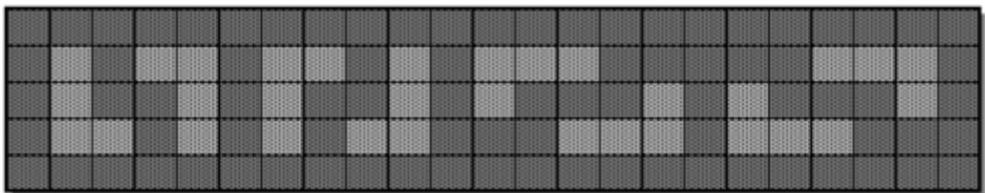
4662 The Puzzle Board from God

Once upon a time, there was a man known as Mr. Bonus (Born at Binus), no one know his real name. One day, after miles of walk, he sat and took a rest. Accidentally, a board fell from sky and hit his head. He was very angry because he thought someone had intentionally thrown that board, but he did not see anyone around. So he thought that board is from God. He tried to look at that board and found a lot of puzzle shape like this:

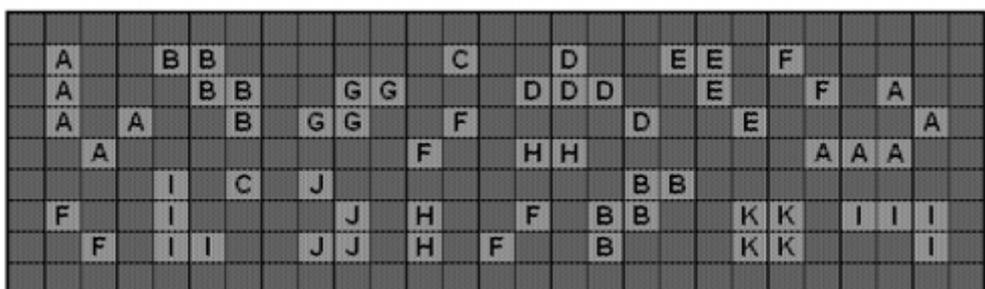


He thought that God want him to calculate how many different shapes are there in that board. Mr. Bonus: “This is very easy, I just need to open my BinusBerry to make a program to calculate it.” But he thought that he should take a rest, so he called you to solve his problem.

You are about to count how many different shapes are there in the board. Two shapes are considered the same if they can be matched by rotating (90, 180, or 270 degree) and/or mirroring. These 8 shapes are considered as the same shape:



You should output the number of different shapes and label the puzzles. The same puzzle should use the same label. This is the result that Mr. Bonus wanted:



Input

Input consists of several cases. Each case begins with two integer R and C ($1 \leq R, C \leq 100$) the number of rows and columns of the board. Next, R rows follow each with C characters (either '0' or '1') which correspond to the puzzle. Input will be ended by $R = C = 0$.

