



PROBLEM 7 – SUDOKU

The Sudoku craze is sweeping the world. Practically every newspaper now carries a daily puzzle and there are even books of puzzles (and helpful hints about how to solve them) available from several publishers. This example shows a typical Sudoku puzzle (left) and its solution (right):

	2	3	7		8	9		
					4			
	4	9					8	1
	9				7	8		6
5		8	3					2
8	6					5	3	
			8					
		2	1		3	6	9	

6	2	3	7	1	8	9	5	4
1	8	5	2	9	4	7	6	3
7	4	9	6	3	5	2	8	1
3	9	4	5	2	7	8	1	6
2	1	6	4	8	9	3	7	5
5	7	8	3	6	1	4	2	9
8	6	1	9	4	2	5	3	7
9	3	7	8	5	6	1	4	2
4	5	2	1	7	3	6	9	8

The aim is to fill in the blank squares such that the digits 1 to 9 appear exactly once in each row, each column and each of the nine 3x3 sub-squares that are marked by shading in the above diagram. Typically, the given digits are carefully chosen and placed so that there is only one solution.

The Sudoku Problem Preparation Company wants to get in on this craze and sees it as a way of making money. Their idea is to publish a series of puzzles with substantial prizes offered to the submitters of the correct answer. They would charge an entry fee and the perception would be that this would fund the prizes.

However, they have a different idea – they intend to produce puzzles with several different solutions and then, when all the answers come in, they will claim that no-one has won the prize and produce an answer that differs from all the submissions. Given that they expect lots of submissions, they obviously want to choose puzzles with several different solutions. This is where you come in.

Write a program that will read in details of several Sudoku puzzles and determine how many different solutions there are for each of them. None of the given puzzles will admit more than 10000 different solutions.



INPUT FORMAT

Input for this problem consists of a sequence of one or more scenarios. Each scenario contains 10 lines.

- The first line contains a puzzle label, which is an integer, n , $1 \leq n \leq 100$.
- The puzzle is described on the next 9 lines, each containing a string of 9 digits in the range 0 to 9, including the limits. Zeroes will denote the blanks that need to be filled in, other digits will denote themselves.

The input will be terminated by a line consisting of a single zero (0). This line should not be processed.

OUTPUT FORMAT

Output will be a sequence of lines, one for each input scenario. Each line will contain in order the puzzle label and the number of ways of solving that puzzle (0 if none), separated by a single space.

SAMPLE INPUT:

```
10
023708900
000004000
049000081
090007806
000000000
508300020
860000530
000800000
002103690
20
003708900
000004000
049000081
090007806
000000000
508300020
860000530
000800000
002103690
0
```

SAMPLE OUTPUT:

```
10 1
20 2
```