



Problem D CrossNumber

Time limit allowed: 10 seconds

Inspired by an infomercial trick, you bet your friend that you can code an app to solve a newspaper crossnumber puzzle faster than she can solve the puzzle by hand.

The puzzle is similar to a crossword, except instead of letters, each cell contains a digit from 0 to 9. Each clue gives the sum of the digits in the corresponding word. Since the puzzle is not meant to frustrate the readership, the puzzle is constructed in such a way that throughout the solution process there is always a word with exactly one unfilled cell.

	¹ 0		² 7		³ 3		⁴ 1	
⁵ 9		3			⁶ 6			
			⁷ 6	⁸	2		⁹	0
	8			9			3	
¹⁰ 3		8	2		5	0		1
	4			1			5	
¹¹ 2			¹² 5		¹³		9	
	¹⁴	4	8		¹⁵	3	4	5
	9				4		5	

Across:

- 5. **21**
- 6. **14**
- 7. **8**
- 9. **4**
- 10. **35**
- 11. **10**
- 12. **16**
- 14. **13**
- 15. **12**

Down:

- 1. **41**
- 2. **20**
- 3. **6**
- 4. **44**
- 8. **19**
- 12. **19**
- 13. **13**

WARNING: Note that the following input format differs the above example.

Input

The input consists of many test cases. Each test case begins with an integer N (2 < N < 100), on a line by itself, which indicates the number of rows and columns in the square puzzle.

The description of each test case consists of:

- N rows that contain N characters each, which is the puzzle grid. The character '.' indicates an unfilled cell, the character '#' indicates a black cell, whereas a digit '0' to '9' indicates the value assigned to the cell as shown in the Sample Input below.
- a line containing the word "Across", and then
- one line for each across clue, which contains three integers: x y sum. "x" and "y" indicate the column and row numbers, respectively, and $1 \leq x, y \leq N$. "sum" is the summation in that across or down.
- a line containing the word "Down", and then
- one line for each down clue formatted in a similar way to an across clue.

Each maximal sequence of horizontal or vertical non-black cells, of length at least two cells, will have exactly one associated clue listed for its top-left square, even if all of its non-black squares are already filled by hints.

A zero on a line by itself indicates the end of input and should not be processed.

Output

For each test case print the solved puzzle in the same format. Each solution should be followed by a blank line.

Sample Input	Output for the Sample Input
5	#####
#####	#073#
#..3#	##5##
##5##	#429#
#4.9#	#####
#####	
Across	
2 2 10	#19
2 4 15	###
Down	
3 2 14	#74
3	
#.9	
###	
#74	
Across	
2 3 11	
2 1 10	
Down	
0	