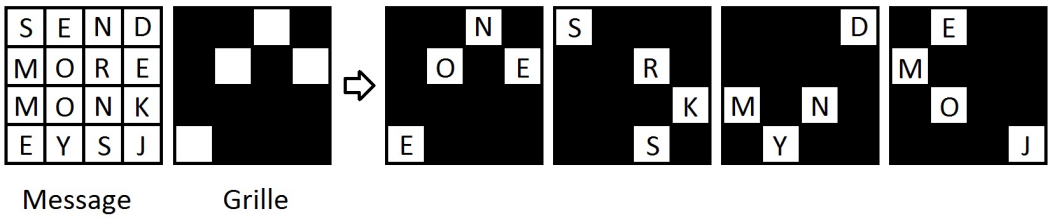
Boys and Grilles

Every boy dreams of writing a love letter to his true love, in a way that only they can understand. The *grille cipher* is an oldschool technique that allows them to accomplish this. In our version of the grille cipher, the message to be encoded is written on an $N \times N$ grid row-wise, top to bottom, and is overlaid with a card with a set of holes punched out of it (the so-called grille).

The message is encrypted by writing down the letters that appear in the holes, row by row, then rotating the grille 90 degrees clockwise, writing the new letters that appear, and repeating this process two more times. Of course, the holes in the grille must be chosen so that every letter in the message will eventually appear in a hole *exactly once* over the process.

An example is shown below, where a boy in love sent the message "Send more monkeys" to the ~~grille~~ girl of his dreams. This message is encrypted as "noeesrksdmnyemoj", after he added a random letter "j" to fill out the grid.



Your task is to take an encrypted message and the corresponding grille and decrypt it. However, the grille given to you might be invalid, i.e., the holes used do not allow every location in the grid to be visible exactly one time during the encryption process. If this is the case, then you must indicate that you can't decrypt the message.

Input

The first line of the input contains a positive integer $N \leq 10$ indicating the size of the grid and grille. The next N lines specify the grille, using '.' for a hole and 'X' for a non-hole. The last line contains the encrypted message, consisting solely of lowercase alphabetic characters. The number of characters in this line is N^2.

Output

Output the decrypted text in a single line with no spaces, or the phrase "`invalid grille`" if the grille is invalid.

Examples

input	output
4 XX.X X.X. XXXX .XXX noeesrksdmnyemoj	sendmoremonkeysj
4 .XX. XXXX XXXX .XX. abcdefghijklmnop	invalid grille
2 X. XX aybb	baby