
10. Shake

Program Name: Shake.java

Input File: shake.dat

Kim and Pat like to text each other but are afraid that their parents might read their text messages. They have decided to write in code so their parents will not know what they are saying. They have developed a method for encoding their messages. The process for their code is:

- Put the message, including spaces, in the smallest square matrix that will hold the message. Fill cells in each row from left to right before moving to the next row. Rows are numbered beginning with row 1 as shown below.
- If there are unused cells at the end of the matrix, the first cell will be filled with an asterisk (*) and the remaining unused cells will be filled with consecutive letters of the alphabet beginning with the letter A and continuing until all empty cells have been filled.
- "Shake" the matrix to encode the message as follows:
 - odd numbered rows rotate each letter to the right one cell with the last cell becoming the first.
 - even numbered rows rotate each letter to the left one cell with the first cell becoming the last.
- Rewrite the coded message in the new order by rows.
- Send the coded message.

For example, the message:

I love Computer Science would fit into the 5x5 matrix at the left below and after the "Shake" the matrix would look like the matrix on the right below.

1	I		L	O	V
2	E		C	O	M
3	P	U	T	E	R
4		S	C	I	E
5	N	C	E	*	A

1	V	I		L	O
2		C	O	M	E
3	R	P	U	T	E
4	S	C	I	E	
5	A	N	C	E	*

The encoded message sent would be: VI LO COMERPUTESCIE ANCE*

You are to write a program that will decode the encoded message.

Input

The first line of input will contain a single integer *n* that indicates the number of encoded messages to be sent. Each the following *n* lines will contain a single encoded message less than 625 characters long.

Output

For each encoded message, you will print the decoded message. Do not include the characters used to fill the matrix.

Example Input File

```
2
VI LO COMERPUTESCIE ANCE*
WINNINGIL DISTU RICT ISHE FIRSTTT STEP WARD STODATE*ABCLEFGHIJK
```

Example Output to Screen

```
I LOVE COMPUTER SCIENCE
WINNING UIL DISTRICT IS THE FIRST STEP TOWARD STATE
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