
6. Code Three

Program Name: Code3.java

Input File: code3.dat

Sally and Nancy have decided to write to each other in a special code. They decide to use the smallest square matrix that will hold all of the characters in their message. They will place their message, one character per cell, into the matrix in diagonal order beginning with the leftmost column and going diagonally upward and to the right and fill any remaining matrix cells with an asterisk (*). For example, the coded message:

DANIOLGA*

would have been placed in a 3x3 matrix as:

```
DAN
IOL
GA*
```

so it could be decoded by reading the characters of the matrix in the order (0,0), (1,0), (0,1), (2,0), (1,1), (0,2), and so forth and finally getting the message:

DIAGONAL*

Input

The first line of input will contain a single integer n that indicates the number of coded messages to follow. Each of the following n lines will contain a single coded message. Each coded message will contain a perfect square number of characters. There will be no spaces in the input.

Output

For each line of input, print the decoded message with no spaces and with the filler asterisks at the end.

Example Input File

```
3
DANIOLGA*
SlaarlayNadoldydhincicaenmslhdeeoras
SltttoeestSvioLthgIa*oUte*
```

Example Output to Screen

```
DIAGONAL*
SallyandNancyaremiddle-schoolairheads
SolvethistogotoUILState**
```