E Encoded Message

Alex wants to send a love poem to his girlfriend Bridget. Unfortunately, she has a nosy friend, Ellen, who might intercept his message and invade their privacy.

To prevent this, Alex has invented a scheme to make his missives indecipherable to Ellen. He arranges the letters into a square, which is rotated a quarter-turn clockwise, and then he puts the resulting letters on a single line again. (For simplicity's sake, Alex doesn't use whitespace or punctuation in his poems.)

For example, the text "`RosesAreRedVioletsAreBlue`" would be encoded as "`eedARBtVrolsiesuAoReerles`" using the following intermediate steps:

R	o	s	e	s
A	r	e	R	e
d	V	i	o	l
e	t	s	A	r
e	B	l	u	e

$\Rightarrow$

e	e	d	A	R
B	t	V	r	o
l	s	i	e	s
u	A	o	R	e
e	r	l	e	s

Ellen has intercepted some of Alex's messages but they make no sense to her. Can you write a program to help her decode them?

Input

On the first line one positive number: the number of test cases, at most 100. After that per test case:

- one line with an encoded message: a string consisting of upper-case and lower-case letters only. The length of the message is a square between 1 and 10 000 characters.

Output

Per test case:

- one line with the original message.

Sample in- and output

Input	Output
3 RSTEEOTCP eedARBtVrolsiesuAoReerles EarSvyeqeBsuneMa	TOPSECRET RosesAreRedVioletsAreBlue SquaresMayBeEven