

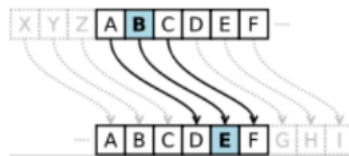
Problem H. Hiding messages

Source file name: H.c, H.cpp, H.java, H.py2, H.py3
 Input: Standard
 Output: Standard
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In the ACM school students use to send message between each others. They don't want teachers to notice what these messages say. Students are really clever so they have created a coding mechanism that will allow them to send messages without teachers noticing what they say.

Students will code the message substituting each of the upper case letters in the message with the letter that is in a fixed number K of positions ahead in the alphabet.

As an example if $K = 3$ then the letter A will be substituted with the letter D, B will be substituted with the letter E, and so on. It is supposed that the alphabet is circular in such way that A is after Z, so the letter Z would be substituted with the letter C, you can see an idea of this in the following figure.



As mentioned above, students only substitute upper case letters all other characters in the message are not changed.

Your task is, given student messages to code each of those messages using the method described.

Input

The first line contains a number T the number of test cases. Each of the test cases start with two numbers N and K being the number of lines in the message and the number of positions that the letters will be shifted. The next N lines in the test case will contain a string that represents a line in the students message.

- $1 \leq T \leq 10$
- $1 \leq N \leq 100$
- $1 \leq K \leq 1000$
- Each line of the student message will contain any printable ASCII character excluding the new line character.

Output

For each line on each of the messages your program should print the encoded message using the method described above.

Example

Input	Output
2	VO UFYUP, y algo NBT
1 1	QlexQndeH
UN TEXT0, y algo MAS	
1 120	
AlexAndeR	