

## 4009 Decode Messages

Being in charge of the computer department of the Agency of International Espionage, you are asked to write a program that will allow a spy to decode their messages.

You can assume a spy's message is at most 400 characters long, and it includes all the uppercase letters of the English alphabet plus the space, any digit, and any of the following characters: '!' ' ' ',' '.' ':' ';' '?' '-'

The algorithm that the department will use to encode all their messages will be following:

- They first encode the message with a simple code key. This simple code key is a one for one character substitution based upon a *single arithmetic manipulation* of the printable portion of the ASCII character set (0..126). This single arithmetic manipulation is the same for each character of the message.
- After, they agree secretly on two numbers that will be used as the number of rows ( $R$ ) and columns ( $C$ ) in a matrix.
- The department then enters the letters of the message encode in spiral pattern along the matrix.

For example, if the message is:

-CDC IS THE TRADEMARK OF THE CONTROL DATA CORPORATION.

and there  $R = 9$  and  $C = 6$ , the department would write down.

**Message encode:**

4JKJ'PZ'[OL'[YHKLTHYR'VM'[OL'JVU[YVS'KH[H'JVYVVYH[PVU5

The matrix would be filled in as follows:

4	J	K	J	'	P
[	O	L	'	J	Z
'	V	Y	W	V	'
M	J	5	V	U	[
V	'	U	Y	[	O
'	H	V	H	Y	L
R	[	P	[	V	'
Y	H	K	'	S	[
H	T	L	K	H	Y

### Input

There will be multiple datasets. Each dataset consist of two lines. The first line contain  $R$  ( $2 \leq R \leq 20$ ), a space,  $C$  ( $2 \leq C \leq 20$ ). The next line is a string of characters that represent the contents of the matrix ( $R \times C$  characters). The characters are in row major order.

The last input set is followed by a line containing two zeros (0 0). This line should not be processed.

### Output

For each dataset, you should one line of output, giving the decoded message.

**Sample Input**

```
9 6
4JKJ'P[OL'JZ'VYVW'MJ5VU[V'UY[O'HVHYLR[P[V'YHK'S[HTLKHY
0 0
```

**Sample Output**

```
-CDC IS THE TRADEMARK OF THE CONTROL DATA CORPORATION.
```