4009 - Decode Messages

Latin America - Mexico and Central America - 2007/2008

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'JVYWVYH[PVU5
```

The matrix would be filled in as follows:

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'VYWV'MJ5VU[V'UY[O'HVHYLR[P[V'YHK'S[HTLKHY
0 0
```

Sample Output

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

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