

The Brave Sir Robin's cAsE cOrReCtOr



Dissatisfied with the loud and constant pronouncements of his alleged misdeeds by a trio of indefatigable minstrels, the brave knight Sir Robin wishes to exercise his authority by modifying their lyrics. The minstrels were happy to provide printed transcripts of their songs, and cheerfully announced that they would not change a word of them.

Undaunted, the brave (and crafty) Sir Robin scrutinized the documents and noticed that their loudest inflections were indicated by capital letters and realized that he could at least lower their voices. This, he reasoned, could be accomplished by replacing upper case letters with lower case letters ("Case correction", from his perspective). These modifications could be forced upon the singers by insistence upon proper usage of the King's English. Not all letters can be lower case, however, as the King's English mandates some letters must be upper case.

Strangely hesitant about performing "case correction" personally, the brave, crafty (and managerially capable) Sir Robin humbly requests you write a program to perform a first pass of case correction for the songs. There will still be some corrections required after this program is used.

As your program reads the file, it must force to upper case all alphabetic characters that follow terminal punctuation marks (period, question mark, and exclamation point) with only white space or parentheses characters following. All other alphabetic characters are to be forced to lower case. Note that decimal numbers are not to be followed by an upper case character unless the number itself is followed by a terminal punctuation mark.

Input

The input file contains the text that you are converting. Your conversions should be based on the rules given by Brave Sir Robin above.

Output

The output is to be the converted text. All characters are transferred to the output. Some will have cAsE cOrReCtOr, others will be directly copied.

Sample input

```
The Brave Sir Robin took a short walk in a dark forest where rabbits did stalk. a
ray of sunlight made him jump from his own shadow with A FACE AS PALE AS CHALK.
```

Sample output

```
the brave sir robin took a short walk in a dark forest where rabbits did stalk. A
ray of sunlight made him jump from his own shadow with a face as pale as chalk.
```