

4923 Mirror, Mirror on the Wall

For most fonts, the lowercase letters **b** and **d** are mirror images of each other, as are the letters **p** and **q**. Furthermore, letters **i**, **o**, **v**, **w**, and **x** are naturally mirror images of themselves. Although other symmetries exist for certain fonts, we consider only those specifically mentioned thus far for the remainder of this problem.

Because of these symmetries, it is possible to encode certain words based upon how those words would appear in the mirror. For example the word **boxwood** would appear as **boowxod**, and the word **ibid** as **bidi**. Given a particular sequence of letters, you are to determine its mirror image or to note that it is invalid.

Input

The input contains a series of letter sequences, one per line, followed by a single line with the '#' character. Each letter sequence consists entirely of lowercase letters.

Output

For each letter sequence in the input, if its mirror image is a legitimate letter sequence based upon the given symmetries, then output that mirror image. If the mirror image does not form a legitimate sequence of characters, then output the word 'INVALID'.

Sample Input

```
boowxod
bidi
bed
bbb
#
```

Sample Output

```
boxwood
ibid
INVALID
ddd
```