Problem 3

CRYPTOLOGY

One popular cryptologic method uses a "key" for encoding and decoding secret messages. If this key were "ZYXWVU..." then an A would encode to a Z, a B to a Y, a C to an X, and so on. This example key is rather boring, so a more interesting key can be generated from any given string using the following strategy:
1.   Remove all non-letters from the string.
2.   Remove all duplicate letters (keep the first occurrence of each letter only.)
3.   Any letters that do not appear should be concatenated (joined) in alphabetical order to the end of the string.
4.   The string is then reversed to form the key.

Note that any key generated, using these steps, will contain exactly, the 26 letters of the alphabet.

To encode a message, any A's would code into the first letter of the code key, any B's to the second, any C's to the third, and so on.

Decoding is the inverse. Find the desired letter in the code key. The position in the key gives the position in the alphabet. For example, if the letter is found at the third position, then it will be decoded into the letter C.

Characters in the message, other than A through Z, remain unchanged in both the decoding and encoding process. Each line of the input will not contain any leading or trailing blanks.

The input file (DATA3) will contain five sets of data. Each data set will consist of three lines: the first line is the string used to form the code key. The second line is the word ENCODE or DECODE. The third line is the message to encode or decode. The length of the strings in the first line and the third line will not exceed 80 characters each. All alphabetic characters will be in uppercase.

The output file (OUT3) will contain five lines of data. Each line will contain the encoded/decoded message.

Sample Input (Two data sets only)

```
AFTER YOU DESIGN THE USER INTERFACE, DEFINE THE PROPERTIES.
ENCODE
TWO WAYS TO CHANGE THE PROPERTY SETTINGS: DURING DESIGN TIME OR RUN TIME
A DEVICE THAT COMPUTES; ESPECIALLY, AN ELECTRONIC MACHINE THAT PERFORMS
DECODE
Z WUQK CHKQ TU POUIFQK QZTZ ZSQ FSHTOCWTFUSH TU WULPCTKOH.
```

Sample Output

```
OEG EZFU OG WKZNLQ OKQ IDGIQDOF UQOOJNLU: VYDJNL VQUJLN OJHQ GD DYN OJHQ
A CODE USED TO PROVIDE DATA AND INSTRUCTIONS TO COMPUTERS.
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