4693 Gothic

What does blood have to do with a party? Very simple:

`blood brood brook brock broch broth booth booty borty porty party`

This is a sequence of minimal length, taken from the 233614 words in Webster's Second International Dictionary, which starts with `blood` and ends with `party` and where two successive words differ by exactly one letter.

Your job is to compute such sequences.

Input

The first line of input contains a positive integer n. Each of the next n lines contains two words separated by white space. The remaining lines of the input contain all words from Webster's Second International Dictionary. For this problem words consist of lower-case letters from '`a`' to '`z`'.

Output

The output must consist of n lines, each one discussing one pair of words in the input: a line must contain a single word from the dictionary equal to both input words; a minimal-length sequence of dictionary words as described above, separated by single blanks starting with the first input word and ending with the second; or the statement '`cannot morph` *word* `into` *word*'.

Sample Input

```
5
blood party
barn burr
aal aam
bottom bottom
automotive laboratory
a
aa
aal
aalii
aam
aani
...
```

Sample Output

```
blood brood brook brock broch broth booth booty borty porty party
barn burn burr
aal aam
bottom
cannot morph automotive into laboratory
```