

4915 Palindromes

Zofka has a deck of cards for spelling practice and every card has exactly one word written on it. Her brother Filip does not read yet but loves building trains. The kids are very excited that they came up with a game that involves both, the spelling cards as well as trains, and they want to tell you all about it.

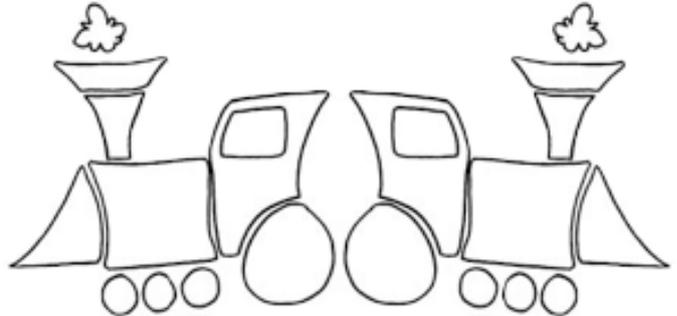
In this game, Filip arranges the cards into a long train, all cards face up, and Zofka can turn as many cards as she wishes 180 degrees so that the word on the card reads backwards.

(Yes, this does turn the letters upside down, but Zofka can still read them.) However, she is not allowed to change the positions of the cards as Filip is very particular about the order of cars in his train!

For example, for a train of cards `car`, `hat`, and `enchanted`, Zofka can flip the first and the last cards so that the train now reads `rac`, `hat`, and `detnahcne`.

In this game, Zofka wants to flip the cards so that, when concatenating all the train words together and crossing out some of the letters, the resulting string is as long as possible and is a palindrome. (A palindrome is a word that reads the same forward and backward.)

For example, in the train above after flipping cards a longest palindrome is `chatdtahc`.



Input

The input file contains several test cases, each of them as described below.

The first line contains a single positive integer n , the number of cards ($n \leq 500$).

The next line contains n words in order, the cards of the train, separated by white space. Each word uses only lower-case letters, 'a' through 'z' (the total number of letters is $\leq 5,000$).

Output

For each test case, the output must follow the description below.

The first line contains a single positive integer, the length of a longest palindrome.

The second line contains the n words from the input, each written either forward or backward, to show a specific train configuration resulting in a longest palindrome.

The third line contains that palindrome as a single word.

Sample Input

```
3
car hat enchanted
```

Sample Output

```
9
rac hat detnahcne
chatdtahc
```