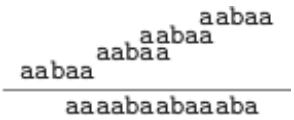
Quasi-template

A template of a word v is such a word s that all occurrences of s within v cover the whole word v (i.e. each letter of the word v appears within some fragment of consecutive letters of v equal to s). By quasi-template of a word v we mean such a word s that s is a substring (i.e. a fragment of consecutive letters) of v and s is a template of some superstring of v. The figure below shows why the word aabaa is a quasi-template of the word aaaabaabaaaba:



For a given word v we would like to compute the number of its quasi-templates and the shortest one of them.

Input

The only line of the standard input contains a non-empty word v that is not longer than 200000 letters. It consists of small letters of English alphabet.

Output

The first line of the standard output should contain the number of quasi-templates of word v. The second line should contain the shortest word being a quasi-template of word v. If there is more than one such shortest word, output the lexicographically smallest from the shortest quasi-templates.

Example

For the input data:

```
aaaabaabaaaba
```

the correct result is:

```
10
aabaa
```

The word from the sample input has 10 quasi-templates: aaaabaabaaab, aaaabaabaaaba, aaabaaba, aaabaabaa, aaabaabaaa, aaabaabaaaba, aabaa, aabaabaa, aabaabaaa, and abaabaaa.