

H Sirrom

Task

The inhabitants of planet Sirrom speak an interesting language, which has very few, but very long words. Additionally they don't separate these words in order to allow some optimizations in their speech. Specifically, if it is true for two adjacent words, that a suffix of the first equals to a prefix of the second, the common part won't be repeated twice. For instance, instead of "cat attack" a sirromian would say "cattack". Sirromians are very smart creatures, so they always choose the longest possible common part of two successive words.

Given the dictionary of the sirromian language, find the length of the shortest sirromian sentence, that contains all the words of the dictionary.

Input

The input will contain several cases. The first line of each case contains a single number n , the number of the words in the sirromian dictionary. Each of the next n lines contains a sirromian word, in no specific order. The last case will have $n = -1$ and should not be processed.

Output

For each case print the length of the shortest sirromian sentence containing all the words of the dictionary.

Restrictions

- n won't be greater than 15
- the length of a word won't be greater than 10000 characters
- each word will contain only the letters from "a" to "z"
- a word isn't considered a prefix or suffix of itself

Example

Input	Output	Explanation
3 cat attack king -1	10	The shortest sentence is "cattacking"