



HOME CONTESTS GYM **PROBLEMSET** GROUPS RATING API CALENDAR

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# D. Restoration of string

time limit per test: 2 seconds memory limit per test: 256 megabytes input: standard input output: standard output

A substring of some string is called the most frequent, if the number of its occurrences is not less than number of occurrences of any other substring.

You are given a set of strings. A string (not necessarily from this set) is called good if all elements of the set are the most frequent substrings of this string. Restore the non-empty good string with minimum length. If several such strings exist, restore lexicographically minimum string. If there are no good strings, print "NO" (without quotes).

A substring of a string is a contiguous subsequence of letters in the string. For example, "ab", "C", "abc" are substrings of string "abc", while "ac" is not a substring of that string.

The number of occurrences of a substring in a string is the number of starting positions in the string where the substring occurs. These occurrences could overlap.

String a is lexicographically smaller than string b, if a is a prefix of b, or a has a smaller letter at the first position where a and b differ.

### Input

The first line contains integer n ( $1 \le n \le 10^5$ ) — the number of strings in the set.

Each of the next *n* lines contains a non-empty string consisting of lowercase English letters. It is guaranteed that the strings are distinct.

The total length of the strings doesn't exceed  $10^5$ .

Print the non-empty good string with minimum length. If several good strings exist, print lexicographically minimum among them. Print "NO" (without guotes) if there are no good strings.

# **Examples**

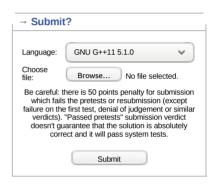
input
nail ni ru f
output
fmailru

input	
3	
kek	
kek preceq cheburek	
output	
NO	

## Note

One can show that in the first sample only two good strings with minimum length exist: "cfmailru" and "mailrucf". The first string is lexicographically minimum.





→ Score table		
	Score	
Problem A	398	
Problem B	796	
Problem C	1194	
Problem D	1592	
Problem E	1990	
Problem F	2388	
Successful hack	100	
Unsuccessful hack	-50	
Unsuccessful submission	-50	
Resubmission	-50	
* If you solve problem on 00:51 from t	he firet attemn	

1 of 2 11/12/17, 6:18 PM Codeforces (c) Copyright 2010-2017 Mike Mirzayanov
The only programming contests Web 2.0 platform
Server time: Nov/12/2017 19:56:41 (c2).
Desktop version, switch to mobile version.

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