

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 ($1 \leq n \leq 10^5$) — 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 .

Output

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

Examples

| input |
|------------------------------|
| 4 mail ai lru cf |
| output |
| cfmailru |

| input |
|--------------------------------|
| 3 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.

Codeforces Round #445 (Div. 2, based on Technocup 2018 Elimination Round 3)

Contest is running

00:49:19

Contestant



→ Submit?

Language: GNU G++11 5.1.0

Choose file: No file selected.

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

→ 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 the first attempt

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