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.

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.