

Problem 2573: Find the String with LCP

Problem Information

Difficulty: Hard

Acceptance Rate: 32.34%

Paid Only: No

Tags: Array, String, Dynamic Programming, Greedy, Union Find, Matrix

Problem Description

We define the `lcp` matrix of any **0-indexed** string `word` of `n` lowercase English letters as an `n x n` grid such that:

* `lcp[i][j]` is equal to the length of the **longest common prefix** between the substrings `word[i,n-1]` and `word[j,n-1]`.

Given an `n x n` matrix `lcp`, return the alphabetically smallest string `word` that corresponds to `lcp`. If there is no such string, return an empty string.

A string `a` is lexicographically smaller than a string `b` (of the same length) if in the first position where `a` and `b` differ, string `a` has a letter that appears earlier in the alphabet than the corresponding letter in `b`. For example, `"aabd"` is lexicographically smaller than `"aaca"` because the first position they differ is at the third letter, and `b` comes before `c`.

Example 1:

Input: `lcp = [[4,0,2,0],[0,3,0,1],[2,0,2,0],[0,1,0,1]]` **Output:** "abab" **Explanation:** lcp corresponds to any 4 letter string with two alternating letters. The lexicographically smallest of them is "abab".

Example 2:

Input: `lcp = [[4,3,2,1],[3,3,2,1],[2,2,2,1],[1,1,1,1]]` **Output:** "aaaa" **Explanation:** lcp corresponds to any 4 letter string with a single distinct letter. The lexicographically smallest of them is "aaaa".

****Example 3:****

****Input:**** `lcp = [[4,3,2,1],[3,3,2,1],[2,2,2,1],[1,1,1,3]]` ****Output:**** "" ****Explanation:**** `lcp[3][3]` cannot be equal to 3 since word[3,...,3] consists of only a single letter; Thus, no answer exists.

****Constraints:****

`* `1 <= n == ``lcp.length == ``lcp[i].length` ` <= 1000` * `0 <= lcp[i][j] <= n``

Code Snippets

C++:

```
class Solution {
public:
    string findTheString(vector<vector<int>>& lcp) {
        }
    };
}
```

Java:

```
class Solution {
public String findTheString(int[][] lcp) {
    }
}
}
```

Python3:

```
class Solution:
    def findTheString(self, lcp: List[List[int]]) -> str:
```