Problem 3081: Replace Question Marks in String to Minimize Its Value

Problem Information

Difficulty: Medium
Acceptance Rate: 28.51%
Paid Only: No
Tags: Hash Table, String, Greedy, Sorting, Heap (Priority Queue), Counting

Problem Description

You are given a string `s`. `s[i]` is either a lowercase English letter or `'?'`.

For a string `t` having length `m` containing **only** lowercase English letters, we define the function `cost(i)` for an index `i` as the number of characters **equal** to `t[i]` that appeared before it, i.e. in the range `[0, i - 1]`.

The **value** of `t` is the **sum** of `cost(i)` for all indices `i`.

For example, for the string `t = "aab"`:

* `cost(0) = 0` * `cost(1) = 1` * `cost(2) = 0` * Hence, the value of `"aab"` is `0 + 1 + 0 = 1`.

Your task is to **replace all** occurrences of `'?'` in `s` with any lowercase English letter so that the **value** of `s` is **minimized**.

Return _a string denoting the modified string with replaced occurrences of_ `'?'` _. If there are multiple strings resulting in the**minimum value** , return the lexicographically smallest one._

Example 1:

Input: s = "???"

Output: "abc"

Explanation: In this example, we can replace the occurrences of `'?'` to make `s` equal to `"abc"`.

For `"abc"`, `cost(0) = 0`, `cost(1) = 0`, and `cost(2) = 0`.

The value of `"abc"` is `0`.

Some other modifications of `s` that have a value of `0` are `"cba"`, `"abz"`, and, `"hey"`.

Among all of them, we choose the lexicographically smallest.

Example 2:

Input: s = "a?a?"

Output: "abac"

Explanation: In this example, the occurrences of `'?'` can be replaced to make `s` equal to `"abac"`.

For `"abac"`, `cost(0) = 0`, `cost(1) = 0`, `cost(2) = 1`, and `cost(3) = 0`.

The value of `"abac"` is `1`.

Constraints:

* `1 <= s.length <= 105` * `s[i]` is either a lowercase English letter or `'?'`.

Code Snippets

C++:

```
class Solution {
public:
string minimizeStringValue(string s) {

}
};
```

Java:

```
class Solution {
public String minimizeStringValue(String s) {

}
}
```

Python3:

```
class Solution:
def minimizeStringValue(self, s: str) -> str:
```