23. 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 at the value of s is minimized.

PROGRAM:

```
def minimize_string_value(s):
    alphabet = "abcdefghijklmnopqrstvwxyz"
    result = list(s)

    for i in range(len(s)):
        if s[i] == '?':
            prefix = s[:i]
            min_cost = float('inf')
            best_char = ''

            for char in alphabet:
                cost = prefix.count(char)
                if cost < min_cost:
                    min_cost = cost
                    best_char = char

            result[i] = best_char
```

```
    return ''.join(result)
s = "a?m?d"
minimized_s = minimize_string_value(s)
print(minimized_s)
```

OUTPUT:

```
PS C:\Users\chall\OneDrive\Desktop\DAA> & C:/Users/chall/AppData/Local/Programs/Python/Python312/python.exe
''
abmbd
PS C:\Users\chall\OneDrive\Desktop\DAA>
```

TIME COMPLEXITY:

Time complexity for the above code is O(n2)