

1358. Number of Substrings Containing All Three Characters

Given a string S consisting only of characters a , b and c .

Return the number of substrings containing **at least** one occurrence of all these characters a , b and c .

Example 1:

Input: $s = \text{"abcabc"}$

Output: 10

Explanation: The substrings containing at least one occurrence of the characters a , b and c are "abc" , "abca" , "abcab" , "abcabc" , "bca" , "bcab" , "bcabc" , "cab" , "cabc" and "abc" (**again**).

Example 2:

Input: $s = \text{"aaacb"}$

Output: 3

Explanation: The substrings containing at least one occurrence of the characters a , b and c are "aaacb" , "aacb" and "acb" .

Example 3:

Input: $s = \text{"abc"}$

Output: 1

Constraints:

- $3 \leq s.length \leq 5 \times 10^4$
- S only consists of a , b or c characters.

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```
/*
    Prefix sums+two pointers (at least(1) 'a', at least(1) 'b', at least(1) 'c')
    Time complexity: O(n)
    Space complexity: O(3)=O(1)
*/
class Solution {
public:
    int numberOfSubstrings(std::string s) {
        int n=s.size();
        int count[3]={0};

        int l=0,ans=0;
        for(int r=0;r<n;++r){
            count[s[r]-'a']++;
            while(count[0]>=1 && count[1]>=1 && count[2]>=1){
                ans+=n-r;
                count[s[l]-'a']--;
                l++;
            }
        }

        return ans;
    }
};
```