Remove All Duplicates from a String

Problem Statement: Given a String remove all the duplicate characters from the given String.

Examples:

Example 1:

Input: s = "bcabc"

Output: "bca"

Explanation: Duplicate Characters are removed

Example 2:

Input: s = "cbacdcbc"

Output: "cbad"

Explanation: Duplicate Characters are removed

Solution:

***Disclaimer**: Don't jump directly to the solution, try it out yourself first.*

Solution 1: Brute Force

Keep two pointers I, j.

i - > For traverse through the string

j - > to check if the character is already present on the left side of the string.

Traverse through the string and for every index i check if str[i] is already present on the left side of the curr idx by looping through (j —> 0 – i -1).

if the same character is found, break through the loop. Now if(i == j) which means we haven't found the same character add it to the res string. At any point, if the same character is found then i and j will not be the same.

Code:

- C++ Code
- Java Code

```
#include<bits/stdc++.h>



using namespace std;



string removeDuplicateLetters(string s) {

  string ans = "";

  for (int i = 0; i < s.length(); i++) { int

    j = 0;

    for (j = 0; j < i; j++) {

      if (s[i] == s[j]) //same character found

      {

        break;

      }

    }

    if (i == j) { ans
      += s[i];

    }

  }
```

Output:

Original String: cbacdcbc

After removing duplicates: cbad

Time Complexity: O(N^2)

Space Complexity: O(1)

Solution 2: Using a frequency array

The input string will only contain lowercase alphabets. So let's create a boolean array of size 26 initialized to false.

Consider the index as the ASCII value of the character.

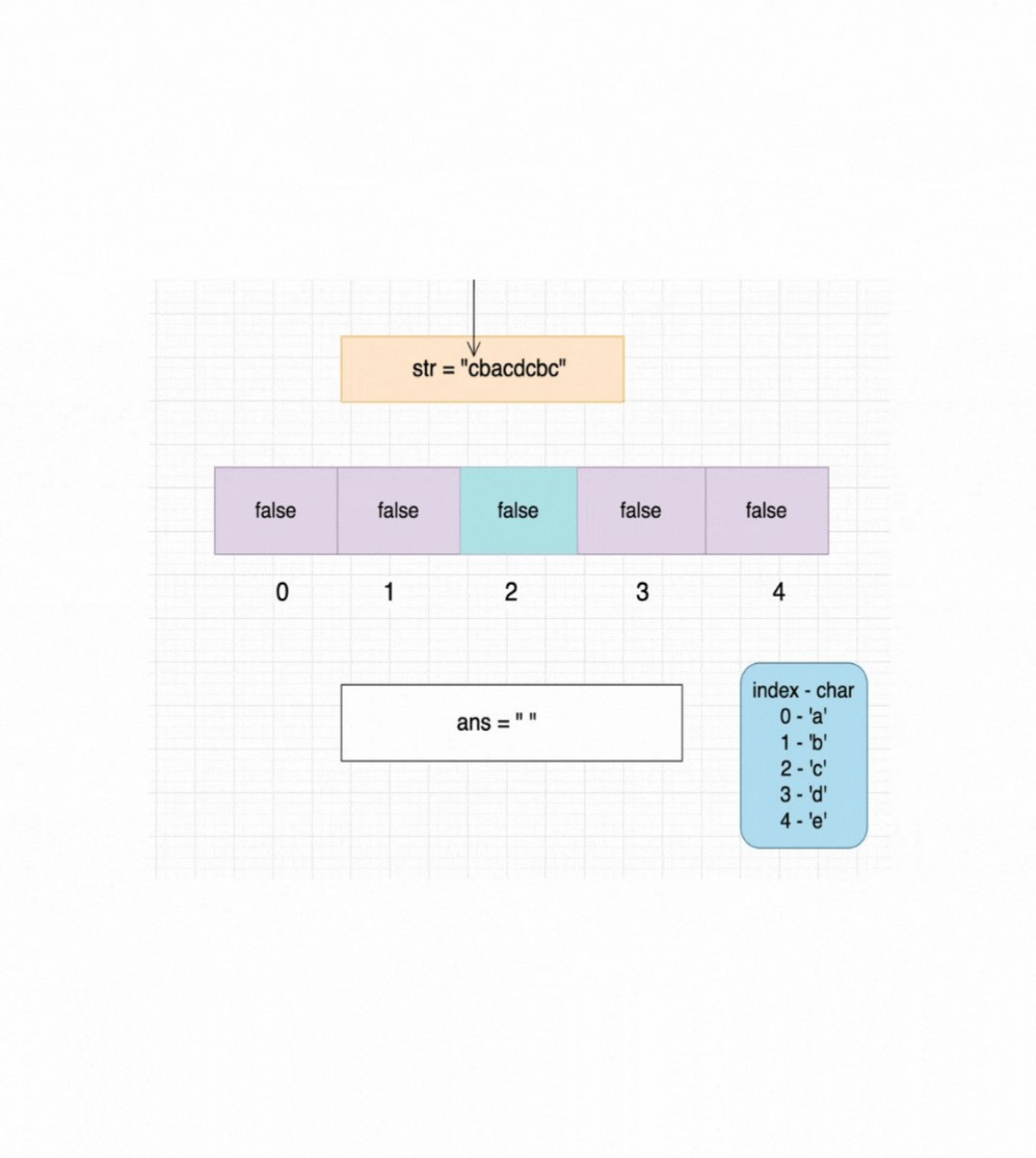
For example: for character ch = 'c'. The index value will be 2.this can be achieved by doing s[i] – 'a' => 99 – 97 = 2 (Since ascii value of 'c' = 99 and 'a' = 97).

Keep a pointer i at the starting of the string. check if the character is already visited or not. if(s[i] – 'a') is false then add that character to ans and make it true.

Repeat it till we reach the end of the string.

Dry Run:

For the dry run let's consider the size of the boolean map to be 5.


str = "cbacdcbc"
false
false
false
false
false
0
1
2
3
4
ans = " "
index - char
0 - 'a'
1 - 'b'
2 - 'c'
3 - 'd'
4 - 'e'

Code:

```
string removeDuplicateLetters(string s) {
  string ans = "";
  vector < bool > map(26, false);
  for (int i = 0; i < s.length(); i++) { if
    (map[s[i] - 'a'] == false) {
      ans += s[i];
      map[s[i] - 'a'] = true;
    }
  }
  return ans;
}
int main() {
  string str = "cbacdcbc";
```

OR:

```
string removeDuplicateLetters(string s)
{
        string res="";
        int length = s.length();
        bool freq[256] = {false};

        for(int i=0; i<s.length(); i++)
        {
            cout<<freq[s[i]-'A']<<endl;

            if(freq[s[i]-'A'] == false)
            {
                freq[s[i]-'A'] =true;
```

```
                res.push_back(s[i]);

            }

            cout<<freq[s[i]-'A']<<endl;

        }
        cout<<"result"<<res<<endl;
        return res;
    }
```

Output:

Original String: cbacdcbc
After removing duplicates: cbad

Time Complexity: O(N)

Space Complexity: O(1)