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## Check for Anagram

**Problem:** Given two strings, check whether two strings are an anagram of each other. Two strings are said to be an anagram of each other if they are just permutations of each other. That is, the set of characters in both the strings must be the same, only the order of characters can be different.

**Input:** string1 = "abcd"  
          string2 = "bcad"

**Output:** Yes

**Input:** string1 = "listen"  
          string2 = "silent"

**Output:** Yes

**Method 1:** Sorting. A simple way to solve this problem is to sort both of the arrays. Since, both the arrays, contain same set of characters, therefore after sorting both of the strings, the strings must become identical.

After sorting, we can use the equals() method to check if both of the strings are equal or not and return true or false accordingly.

**Implementation:**

C++

Java



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```
// C++ program to check whether two strings are anagrams
// of each other
#include <bits/stdc++.h>
using namespace std;

/* function to check whether two strings are anagram of
each other */
bool areAnagram(string str1, string str2)
{
    // Get lengths of both strings
    int n1 = str1.length();
    int n2 = str2.length();

    // If length of both strings is not same, then they
    // cannot be anagram
    if (n1 != n2)
        return false;

    // Sort both the strings
    sort(str1.begin(), str1.end());
    sort(str2.begin(), str2.end());

    // Compare sorted strings
    for (int i = 0; i < n1; i++)
        if (str1[i] != str2[i])
            return false;
```





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```
        return true;
    }

    // Driver code
    int main()
    {
        string str1 = "test";
        string str2 = "ttew";

        // Function Call
        if (areAnagram(str1, str2))
            cout << "The two strings are anagram of each other";
        else
            cout << "The two strings are not anagram of each "
                "other";

        return 0;
    }
```



## Output

The two strings are not anagram of each other

**Time Complexity:**  $O(N \cdot \log N)$

**Auxiliary Space:**  $O(1)$

## Method 2 (Count characters)

This method assumes that the set of possible characters in both strings is small. In the following implementation, it is

assumed that the characters are stored using 8 bit and there can be 256 possible characters.

1. Create count arrays of size 256 for both strings. Initialize all values in count arrays as 0.

arrays.

3. Compare count arrays. If both count arrays are same, then return true.

Below is the implementation of the above idea:

C++

Java

```
// C++ program to check if two strings
// are anagrams of each other
#include <bits/stdc++.h>
using namespace std;
#define NO_OF_CHARS 256

/* function to check whether two strings are anagram of
each other */
bool areAnagram(char* str1, char* str2)
{
    // Create 2 count arrays and initialize all values as 0
    int count1[NO_OF_CHARS] = { 0 };
    int count2[NO_OF_CHARS] = { 0 };
    int i;

    // For each character in input strings, increment count
    // in the corresponding count array
    for (i = 0; str1[i] && str2[i]; i++) {
        count1[str1[i]]++;
    }
```

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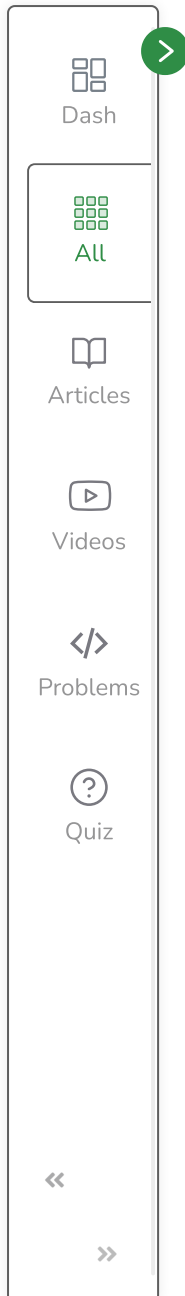


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```

        count2[str2[i]]++;
    }

    // If both strings are of different length. Removing
    // this condition will make the program fail for strings
    // like "aaca" and "aca"
    if (str1[i] || str2[i])
        return false;

    // Compare count arrays
    for (i = 0; i < NO_OF_CHARS; i++)
        if (count1[i] != count2[i])
            return false;

    return true;
}

/* Driver code*/
int main()
{
    char str1[] = "geeksforgeeks";
    char str2[] = "forgeeksgeeks";

    // Function Call
    if (areAnagram(str1, str2))
        cout << "The two strings are anagram of each other";
    else
        cout << "The two strings are not anagram of each "
            "other";
}

```





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```
return 0;
}
```

// This is code is contributed by rathbhupendra

## Output

The two strings are anagram of each other

**Time Complexity :**  $O(n)$

**Space Complexity :**  $O(\text{NO\_OF\_CHAR}) = O(256) = O(1)$  (constant space use)

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