

1662. Check If Two String Arrays are Equivalent

Easy Array String

[Leetcode Link](#)

Problem Description

This problem presents two arrays, `word1` and `word2`, each containing strings. The task is to determine if these two arrays represent the same string when their contents are concatenated together. In other words, if we join all the elements of `word1` end-to-end to make a single string and do the same with `word2`, and those two resulting strings are identical, we should return `true`. Otherwise, we will return `false`. It is essential to concatenate the elements in the order they appear in their respective arrays.

Intuition

To solve this problem, we rely on the simple property that strings are equal if they contain the same sequence of characters in the same order. Therefore, the solution approach is straightforward:

- Concatenate all elements in `word1` to form a single string.
- Concatenate all elements in `word2` to form another single string.
- Compare these two strings for equality.

If both strings are equal, it means the arrays `word1` and `word2` represent the same string; thus, we return `true`. If they differ, the arrays represent different strings, so we return `false`. This is achieved with minimal code by using the `join` method in Python, which concatenates the elements of a list into a string, separated by the string provided to `join` (in this case, an empty string as we don't want any characters between the elements).

Solution Approach

The implementation of the solution is straightforward and elegant, thanks to Python's high-level string handling capabilities. The algorithm does not rely on complex data structures or patterns; it primarily uses the built-in string functionality provided by Python.

Here's a step-by-step walk-through of the `arrayStringsAreEqual` function within the `Solution` class:

- The `join` method is called on an empty string ('') with `word1` as the argument. The `join` method takes all elements in `word1`, which are strings themselves, and concatenates them in the order they appear in the array. This results in a single string that represents the concatenation of all individual strings in `word1`.

```
joined_word1 = ''.join(word1)
```

- The same process is applied to `word2`:

```
joined_word2 = ''.join(word2)
```

- Now, we have two strings represented by `joined_word1` and `joined_word2`. All that remains is to check whether these two strings are identical.

```
result = joined_word1 == joined_word2
```

- The result of this comparison is a boolean (`True` or `False`). The function directly returns this result, completing the check with a single line of code:

```
return joined_word1 == joined_word2
```

This approach takes full advantage of Python's ability to handle strings and perform operations on lists. It effectively reduces what could be a more complex algorithm involving manual iteration and concatenation to a simple one-liner that is easy to understand and maintain.

Example Walkthrough

Let's consider an example where `word1 = ["ab", "c"]` and `word2 = ["a", "bc"]`. We need to follow the described solution approach to determine if these two arrays represent the same string when concatenated.

- First, we concatenate the elements of `word1` using the `join` method on an empty string.

```
1 joined_word1 = ''.join(["ab", "c"]) # This evaluates to "abc"
```

After applying the `join` method, we end up with the string `"abc"`.

- Next, we concatenate the elements of `word2`.

```
1 joined_word2 = ''.join(["a", "bc"]) # This evaluates to "abc"
```

Similarly, the `join` method results in the string `"abc"` for `word2`.

- Now we have both strings obtained from `word1` and `word2` respectively. We will now compare these two strings to check if they are identical:

```
1 result = joined_word1 == joined_word2 # This evaluates to True
```

In this case, `joined_word1` is `"abc"` and `joined_word2` is also `"abc"`. The comparison yields `True`.

- Finally, we will directly return the result of the comparison:

```
1 return result # This returns True
```

Since `result` was `True`, the function would return `True`, indicating that `word1` and `word2` do indeed represent the same string when concatenated.

Therefore, given the inputs `word1 = ["ab", "c"]` and `word2 = ["a", "bc"]`, the function `arrayStringsAreEqual` will return `True`, as the concatenated strings from both arrays are identical.

Python Solution

```
1 from typing import List # Import the List type from typing module for type annotations
2
3 class Solution:
4     def array_strings_are_equal(self, word1: List[str], word2: List[str]) -> bool:
5         """
6         Checks if the strings from two lists are equal when concatenated.
7
8         Parameters:
9         word1 (List[str]): First list of strings.
10        word2 (List[str]): Second list of strings.
11
12        Returns:
13        bool: True if the concatenated strings are equal, False otherwise.
14        """
15        # Concatenate all strings in the first list and compare with the concatenation of the second list
16        return ''.join(word1) == ''.join(word2)
17
```

Java Solution

```
1 class Solution {
2
3     /**
4      * Checks if two string arrays are equal when their elements are concatenated.
5      * @param wordArray1 The first array of strings.
6      * @param wordArray2 The second array of strings.
7      * @return true if the concatenated strings are equal, false otherwise.
8      */
9     public boolean arrayStringsAreEqual(String[] wordArray1, String[] wordArray2) {
10        // Join the elements of the first array into a single string
11        String concatenatedWord1 = String.join("", wordArray1);
12
13        // Join the elements of the second array into a single string
14        String concatenatedWord2 = String.join("", wordArray2);
15
16        // Compare the two concatenated strings for equality
17        return concatenatedWord1.equals(concatenatedWord2);
18    }
19 }
20
```

C++ Solution

```
1 #include <vector>
2 #include <string>
3 #include <numeric> // Required for std::accumulate
4
5 class Solution {
6 public:
7     bool arrayStringsAreEqual(vector<string>& word1, vector<string>& word2) {
8         // Convert the first vector of strings into a single string
9         std::string concatenatedWord1 = std::accumulate(word1.begin(), word1.end(), std::string(""));
10
11        // Convert the second vector of strings into a single string
12        std::string concatenatedWord2 = std::accumulate(word2.begin(), word2.end(), std::string(""));
13
14        // Compare the two concatenated strings and return whether they are equal
15        return concatenatedWord1 == concatenatedWord2;
16    }
17 };
18
```

Typescript Solution

```
1 // This function checks if two arrays of strings are equivalent after combining their elements.
2 // @param {string[]} firstWordArray - The first array of strings to be compared.
3 // @param {string[]} secondWordArray - The second array of strings to be compared.
4 // @return {boolean} - Returns true if the concatenated strings are equal, otherwise false.
5 function arrayStringsAreEqual(firstWordArray: string[], secondWordArray: string[]): boolean {
6     // Concatenate the elements of the first array into a single string
7     const firstCombinedString = firstWordArray.join('');
8
9     // Concatenate the elements of the second array into a single string
10    const secondCombinedString = secondWordArray.join('');
11
12    // Compare the concatenated strings for equality and return the result
13    return firstCombinedString === secondCombinedString;
14 }
15
```

Time and Space Complexity

The time complexity of the code is $O(m + n)$ where m is the total number of characters in `word1` and n is the total number of characters in `word2`. This is because the join operations for `word1` and `word2` each iterate over their respective arrays to build a single string, which takes linear time relative to the number of characters in each array.

The space complexity of the code is $O(m + n)$ as well, since it needs to allocate space for the new strings generated by `''.join(word1)` and `''.join(word2)`. No additional space is required beyond the strings themselves.