BUCKMAN LABORATORIES PVT LTD

Software Internship
Round 1

Programming Challenge

Submission Instructions:

- Provide a separate file for each question's solution using the appropriate file extensions (e.g., `.py` for Python, `.js` for JavaScript).
- All solution files should be compressed into a single `.zip` archive, named after the student (e.g., `John_Doe.zip`).
- Each student's `.zip` file should then be included in a master zip file containing all submissions.
- Email the master zip file to **snagarajan@buckman.com** with the subject:

  "<College Name> Buckman Interview - Round 1 Submissions".

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1. Two Sum

Problem: Given an array of integers `nums` and an integer `target`, return the indices of the two numbers such that they add up to `target`.

Example:

Input: nums = [2, 7, 11, 15], target = 9
Output: [0,1] // Because nums[0] + nums[1] = 2 + 7 = 9

Constraints:

- Each input has exactly one solution.
- You may not use the same element twice.
- You can return the answer in any order.

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2. Merge Objects

Problem: Given two objects (or dictionaries in Python) `obj1` and `obj2`, merge them into a single object. If a key exists in both objects, the value from `obj2` should overwrite the value from `obj1`.

Example:

Input: obj1 = {"a": 1, "b": 2}, obj2 = {"b": 3, "c": 4}
Output: {"a": 1, "b": 3, "c": 4}

Constraints:

- Objects will only contain string keys and integer values.
- The merged object should maintain all unique keys.

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3. Longest Substring Without Repeating Characters

Problem: Given a string `s`, find the length of the longest substring without repeating characters.

Example:

Input: s = "abcabcbb"
Output: 3 // The longest substring is "abc"

Constraints:

- `0 ≤ s.length ≤ 5 * 10^4`
- `s` consists of English letters, digits, symbols, and spaces.

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4. Group Anagrams

Problem: Given an array of strings `strs`, group the anagrams together.

Example:

Input: strs = ["eat", "tea", "tan", "ate", "nat", "bat"]
Output: [["eat", "tea", "ate"], ["tan", "nat"], ["bat"]]

Constraints:

- All words contain lowercase English letters.
- The answer can be returned in any order.

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5. Median of Two Sorted Arrays

Problem: Given two sorted arrays `nums1` and `nums2` of sizes `m` and `n`, return the median of the two sorted arrays.

Example:

Input: nums1 = [1, 3], nums2 = [2]
Output: 2.0 // The merged array is [1, 2, 3], and the median is 2.

Constraints:

- The overall run time complexity should be `O(log (m+n))`.

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6. Edit Distance

Problem: Given two strings `word1` and `word2`, return the minimum number of operations required to convert `word1` to `word2`. You can perform three operations:

- Insert a character
- Delete a character
- Replace a character

Example:

Input: word1 = "horse", word2 = "ros"
Output: 3
Explanation:
horse -> rorse (replace 'h' with 'r')
rorse -> rose (delete 'r')
rose -> ros (delete 'e')

Constraints:

- `0 ≤ word1.length, word2.length ≤ 500`
- `word1` and `word2` consist of lowercase English letters.
