July 2023 CSE102

Offline 3

Array & String

Problem 1:

Given two sorted arrays nums1 and nums2 of size m and n respectively, return the median of the two sorted arrays. The first input line consists of m and n. The next line consists of m numbers, and the following line consists of n numbers.

Example 1:

Input: 2 1

1 3

2

Output: 2

Explanation: Here, the first line inputs m and n. The next line is array [1, 3] and the next line is array [2]. The merged array is [1, 2, 3], and the median is 2.

Example 2:

Input: 2 2

1 2

3 4

Output: 2.5

Explanation: The merged array is [1, 2, 3, 4], and the median is (2 + 3) / 2 = 2.5.

Constraints:

- 0 <= m <= 1000
- 0 <= n <= 1000
- 1 <= m + n <= 2000
- -106 <= nums1[i], nums2[i] <= 106

Problem 2:

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

Example 1:

Input: abcabcbb

Output: 3

Explanation: The answer is "abc", with a length of 3.

Example 2:

Input: bbbbb

Output: 1

Explanation: The answer is "b", with a length of 1.

Example 3:

Input: pwwkew

Output: 3

Explanation: The answer is "wke", with a length of 3.

Notice that the answer must be a substring; "pwke" is a subsequence and not a substring.

Constraints:

- 0 <= s.length <= 5 * 104
- s consists of English letters, digits, symbols, and spaces.

Problem 3:

Given an input string s and a pattern p, check whether the pattern p is the regular expression matching of string s with support for '.' and '*' where:

- '.' matches any single character
- '*' matches zero or more of the preceding element

The p pattern has **at most one '.' and one '*'**. The matching should cover the entire input string (not partial).

Example 1:

Input: aa a

Output: false

Explanation: "a" does not match the entire string "aa".

Example 2:

Input: aa a*

Output: true

Explanation: ‘*’ means zero or more of the preceding element, 'a'. Therefore, by repeating 'a' once, it becomes "aa".

Example 3:

Input: ab .*

Output: true

Explanation: ".*" means "zero or more (*) of any character (.)".

Constraints:

- 1 <= s.length <= 20
- 1 <= p.length <= 20
- s contains only lowercase English letters.
- p contains only lowercase English letters, '.', and '*'.
- It is guaranteed that for each appearance of the character '*', there will be a previous valid character to match.

Submission Guidelines:

- ➔ Solve the first problem and rename the file as ***<your_id>_3_1.c*** (example: student with ID 2205999 will rename it ***2205999_3_1.c***).
- ➔ Solve the second problem and rename the file as ***<your_id>_3_2.c*** (***2205999_3_2.c***).
- ➔ Solve the third problem and rename the file as ***<your_id>_3_3.c*** (***2205999_3_3.c***).
- ➔ Now, place these three files inside a folder named ***<your_id>_3*** (***2205999_3***).
- ➔ Zip the folder, name it <your_id>_3.zip (2205999_3.zip), and upload the zipped file in Moodle.
- ➔ **Deadline: Friday, 26 January 2024 10:00 PM.**
- ➔ **Do not copy from your classmate. In this case, both of you will get -100%. Also, do not copy code from any website or ChatGPT. You will get -200% in this case.**