Assessment-1 Explanation_Pentonix

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

Input: s = "abcabcbb"

Output: 3

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

ANSWER Explanation:-

- A. The function length_of_longest_substring() takes a string s as input.
- B. It creates a dictionary index to store the index of each character in the string.
- C. It initializes the variables length and start to 0.
- D. It iterates through the string from index end = 0 to end = len(s) 1.
 - 1. If the character at index end is already in the dictionary index and its index is greater than or equal to start, then it updates start to be the index of the character in index + 1.
 - 2. It then updates the dictionary index with the index of the character at index end.
 - 3. It updates length to be the maximum of length and end start + 1.
- E. The function returns length.

-: Here is a more detailed explanation of the steps:-

Step-1:-

The function length_of_longest_substring() takes a string s as input. This is the string that we want to find the longest substring without repeating characters for.

Step-2:-

The function creates a dictionary index to store the index of each character in the string. This dictionary will be used to keep track of the first occurrence of each character in the string.

Step-3:-

The function initializes the variables length and start to 0. The variable length will store the length of the longest substring without repeating characters, and the variable start will store the starting index of the current substring.

Step-4:-

The function iterates through the string from index end = 0 to end = len(s) - 1. For each character in the string, the function performs the following steps:-

- 1. Checks if the character is already in the dictionary index.
- 2. If the character is already in the dictionary, then the function checks if its index is greater than or equal to start.

- 3. If the character's index is greater than or equal to start, then it means that the character has already appeared in the current substring. In this case, the function updates start to be the index of the character in index + 1. This ensures that the current substring will not include the repeated character.
- 4. If the character's index is less than start, then it means that the character has not yet appeared in the current substring. In this case, the function does not need to update start.
- 5. Updates the dictionary index with the index of the character at index end.
- 6. Updates the variable length to be the maximum of length and end start + 1. This ensures that length always stores the length of the longest substring without repeating characters up to the current character.

Step-5:-

The function returns length. This is the length of the longest substring without repeating characters in the string s.