

8: Leetcode 3 Longest Substring Without Repeating Characters

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<https://leetcode.com/problems/longest-substring-without-repeating-characters/>

Description

The screenshot shows the LeetCode problem page for "3. Longest Substring Without Repeating Characters". The page has a dark theme. At the top, there are navigation links: Description, Editorial, Accepted (with a status of "X"), Solutions, and Submissions. To the right of these are icons for back, forward, and search. Below the links, the title "3. Longest Substring Without Repeating Characters" is displayed in large white font, with a "Solved" button to its right. Under the title are four buttons: Medium, Topics, Companies, and Hint. The main content area contains the problem statement: "Given a string s, find the length of the longest substring without repeating characters." Below this are three examples, each with input, output, and explanation.

Example 1:

Input: s = "abcabcbb"
Output: 3
Explanation: The answer is "abc", with the length of 3.

Example 2:

Input: s = "bbbbbb"
Output: 1
Explanation: The answer is "b", with the length of 1.

Example 3:

Input: s = "pwwkew"
Output: 3
Explanation: The answer is "wke", with the length of 3.
Notice that the answer must be a substring, "pwke" is a subsequence and not a substring.

2 - Code

```
class Solution:
    def lengthOfLongestSubstring(self, s: str) -> int:
        left = 0
        longest = 0
        substringSet = set()
        for right in range(len(s)):
            while s[right] in substringSet:
                substringSet.remove(s[left])
                left += 1

            substringSet.add(s[right])
            longest = max(longest, right - left + 1)
        return longest
```

3 - Notes

Q) 3. Longest substring without repeating characters?

→ YT: Greg Hogg

contiguous or $\overbrace{abg}^{\text{abc}}, \overbrace{a}^{\text{bc}}, \overbrace{bc}^{\text{a}}, \overbrace{c}^{\text{ba}}$

$\rightarrow \text{len} = 3$

i) Algo:

→ validating window (l, r) → if check if current letter already in set, → if not add, update if yes → remove it, inc left +, → step 7.

0 1 2 3 4 5 6 7
 $\overbrace{a}^{\text{a}}, \overbrace{b}^{\text{b}}, \overbrace{c}^{\text{c}}, \overbrace{a}^{\text{b}}, \overbrace{b}^{\text{c}}, \overbrace{b}^{\text{b}}$

\downarrow $\text{set} = \{a\}$ $\text{long} = 1$

$l=0, r=0$ a not present add → set $\{a\}$ $\text{long} = 1$

$l=0, r=1$ b not present add → set $\{a, b\}$ $\text{long} = 2$

" " $r=2$ c not present add → set $\{a, b, c\}$ $\text{long} = 3$

$l=0, r=3$ a is present: remove a → set $\{b, c\}$ $\text{long} = 3$ (max) NC

$l=1, r=3$ a not, : add → set $\{b, c, a\}$ $\text{long} = 3$

$l=1, r=4$ b is present: remove b → set $\{c, a\}$ $\text{long} = 3$ (max) NC

$l=2, r=4$ b not pres, : add → set $\{c, a, b\}$ $\text{long} = 3$.

$l=2, r=5$ c is pres, : remove c → set $\{a, b\}$ $\text{long} = 3$ (max) NC

$l=3, r=5$ c not → add → set $\{a, b, c\}$ $\text{long} = 3$

$l=3, r=6$ b is pres, remove b → set $\{a, c\}$ $\text{long} = 3$ (max NC)

$l=4, r=6$ b is pres, remove b → set $\{c\}$ $\text{long} = 3$ NC

$l=5, r=6$ b not, add → set $\{a, b\}$ $\text{long} = 3$ (NC)

$l=5, r=7$ b is pres, remove b → set $\{b\}$

$l=6, r=7$ b is pres, remove b → set $\{b\}$

$l=7, r=7$ b not, add → set $\{b\}$

$l=7, r=8$ b is pres, remove b → set $\{b\}$

