

### 3. Longest Substring without Repeating char

2-4-25

Ques

String S, Find the length of

Ex:

the longest substring without repeating char

S = "abcabcbb"

wants

longest substring without

repeating chars. wants size

(int)

P<sub>1</sub>  
[a, b, c, a, b, c, b, b]

repeating  
which means

abc size of n = 3

is the largest substring.

What does this mean

a word sequence

Substring can't have

duplicate chars.

want longest sub string

we can detect duplicates repeats

if use p<sub>1</sub>

p<sub>1</sub>

p<sub>2</sub>

one pointer

approach

[d, v, d, f]

(he can use two pointers)

P<sub>1</sub> P<sub>2</sub>

↓ ↓

[d, v, d, f]

P<sub>1</sub> P<sub>2</sub>

[d, v, d, f]

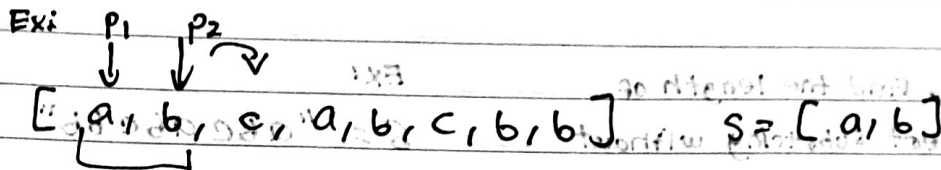
P<sub>1</sub> P<sub>2</sub>

[d, v, d, f]

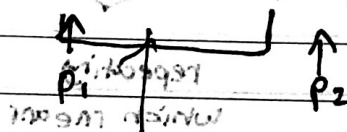
No repeating char

then size n = 3

### 3. - continued

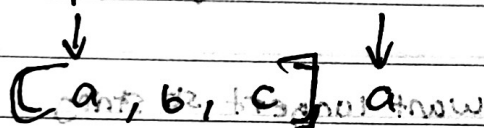


$[a, b, c, a, b, c, b, b]$

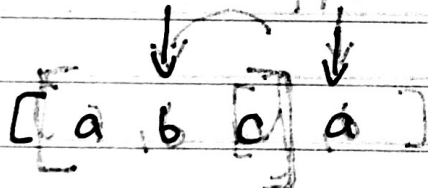
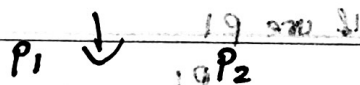


$S = [a, b]$

$P_1$   $P_2$



set =  $[a, b, c]$



set =  $[b, c]$

set =  $[ ]$

Time Complexity  $O(n)$

Space Complexity  $O(n)$  because of the set

have to check for constraints  $0 < S.length < 5 \times 10^4$

see about constraints and the nature of the data.

