

# Longest Substring With Exactly K Unique Characters

aabcbcd bca  
2

a a b b c b c d b c a  
j  
i

k = 2

ans = ~~aab~~  
~~aabb~~  
bbcb

c-1

a-1

"aabacbebebe", K = 3

```
while(i < s.length() - 1) {  
    //acquire  
    while(i < s.length()-1) {  
        i++;  
  
        char ch = s.charAt(i);  
        int nf = map.getOrDefault(ch,0) + 1;  
        map.put(ch,nf);  
  
        if(map.size() == k) {  
            //valid  
            int len = i - j;  
            ans = Math.max(len,ans);  
        }  
        else if(map.size() == k+1){  
            //invalid  
            break;  
        }  
    }  
  
    //release  
    while(j < i && map.size() == k+1) {  
        j++;  
  
        char ch = s.charAt(j);  
  
        if(map.get(ch) == 1) {  
            map.remove(ch);  
        }  
        else {  
            int nf = map.get(ch) - 1;  
            map.put(ch,nf);  
        }  
    }  
}
```

a a b a <sup>j</sup> c b e b e b e <sub>i</sub>  
(j+1 to i)

ans = ~~8~~  
7

b - 3  
c - 1  
e - 3

difficult

## Count Of Substrings With Exactly K Unique Characters

$k = 2$

aabcbcd bca

j

a a b b c b c d b c a

i

count of ss exactly  $k$  dc = count of ss with atmost  $k$  -

count of ss with atmost  $(k-1)$  dc

a b a b c d

exactly 2 dc ss = ab, aba, ba,  
abab, bab, ab,  
bc, cd

$k = 2$

atmost 2 dc ss

~~a~~  
~~ab, b~~  
~~aba, ba, a~~  
~~abab, bab, ab, b~~  
~~bc, c~~  
~~cd, d~~

①

atmost 1 dc ss

~~a, b, c, b, c, d~~

②

$$k = 3$$

atmost 3  $\rightarrow$  1, 2, 3 (1)

atmost 2  $\rightarrow$  1, 2 (2)

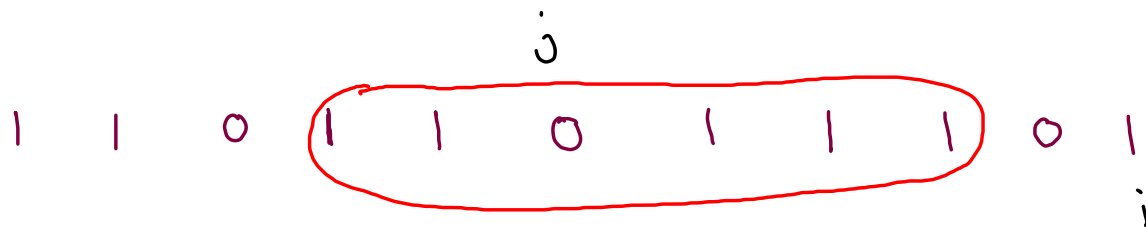
(1) - (2)  $\Rightarrow$  exactly k

883 · Max Consecutive Ones II ✓

↖ window

(allowed to flip one 0 → 1) → free operation

$O(n)$



ans = ~~5~~ 6

acquire :

$count = 1$

release ;

### 386 · Longest Substring with At Most K Distinct Characters

$$k = 2$$

aabcbcbca  
2

a a b c b c d <sup>j</sup> b c a

ans: ~~7~~  
~~7~~  
~~3~~  
4

(2)

$a_1$

$\text{map.size()} \leq k$  } ans updation

## Count Of Substrings Having At Most K Unique Characters

$$1 < z < 2$$

atmost 1c  $\rightarrow \leq 1c$

a a b c b c d b c a

a      aa      aab      bc      bcb      bcbc    cd    db    bc    ca

               ab                  cb                  cbc                  d                  b                  c                  a

                              b                               b                               c                               c

(-1)

a-1