Q.1 Sliding Window Maximum

Google FB Amazon MS Walmart

Given an Array of size N. Return an Array containing the MAX of every window of size K.

A: 10, 8, 9, 7, 6, 5, 11, 3 K = 3

[10 , 9 , 9 , 7 , 11 , 11]

Quiz-1

A : [1, 3 , −1 , −3 , 5 , 3 , 6 , 7] K = 3

[3 , 3 , 5 , 5 , 6 , 7]

Quiz-2

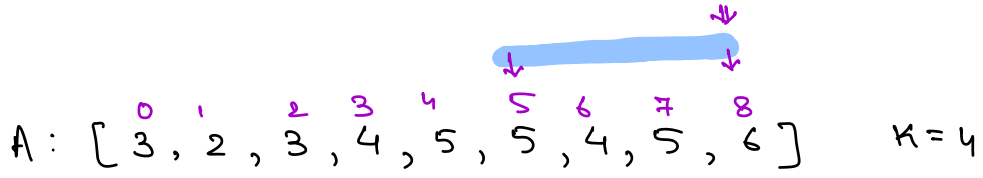
A : [3 , 2 , 3 , 4 , 5 , 5 , 4 , 5 , 6] K = 4

[4 , 5 , 5 , 5 , 5 6]

A: 10, 8, 9, 7, 6, 5, 11, 3 ↓ K > 1

10, 8, 9, 7, 6, 5, 11, 3

Ex

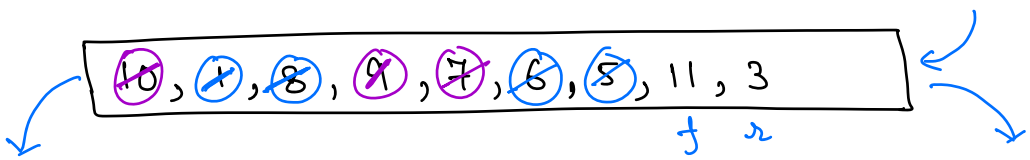


DS

Ans [4, 5, 5, 5, 5, 6]

Ex : A: 10, 1, 8, 9, 7, 6, 5, 11, 3 K = 3

DS



ans: [10, 9, 9, 9, 7, 11, 11]

Deque (Doubly Ended Queue)

↳ DLL

- push_front(x)
- push_rear(x)
- pop_front()
- pop_rear()
- size()
- isEmpty()
- front()
- rear()

```
dequeue<int> dq;
list<int> ans;
for(i=0; i<K; i++) {
    while(dq.size()>0 && dq.rear()<A[i])
        dq.pop_rear();
    dq.push_rear(A[i]);
}
ans.add(dq.front());
inden = 0
for(i=K; i<N; i++) {
    if(A[inden] == dq.front()){
        dq.pop_front();
    }
    while(dq.size()>0 && dq.rear()<A[i])
        dq.pop_rear();
    dq.push_rear(A[i]);
    ans.push(dq.front());
    inden++;
}
```

TC : $O(2N) \rightarrow O(N)$

SC : $O(K) \Rightarrow O(N)$

Dry Run

$$A: [\overset{0}{1}, \overset{1}{3}, \overset{2}{-1}, \overset{3}{-3}, \overset{4}{5}, \overset{5}{3}, \overset{6}{6}, \overset{7}{7}] \quad K = 3$$

k (above index 3); ↑ index (under index 5); ↑ i (after the end of the array)

Dq: ~~1~~, ~~3~~, ~~-1~~, ~~-3~~, ~~5~~, ~~3~~, ~~6~~, 7

f, r (under 7)

ans: [3, 3, 5, 5, 6, 7]

Hard.

Q. Given an encrypted string, find the k^{th} character after decrypting it.

Google
Meta
Scaler.

S: ab2c3 k = 8

↓

ababcababcababc

↓ k^{th} char. (at the 8th character)

Quiz

x2y3 , k = 3

xxyxxyxxy

Quiz

ab2cd2 , k = 11 ⇒ (c)

ababcdababⓒd

ab100cd200ef1000

Ex

ab2c3 k = 8

⇒ ababcababcababc

find 8th char in a string of len 15.

find (8%5) char in a string of len 5

3

ab2c3 k = 8

length : 1 2 4 5 (15)

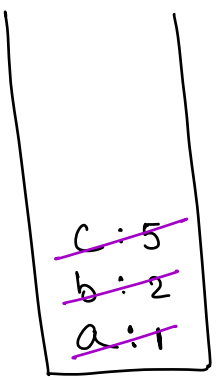
Char : a b c

k = 8 —%5→ (3) —%2→ (1) ⇒ (a)

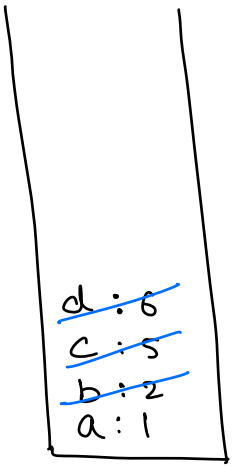
ab2c3 k = 8

length : x x x 5

k = 8 —%5→ 3 —%2→ 1



Ex a b 2 c d 2 k = 10



length = 1 2 4 5 6

$6 * 2 > k\ 10$ ✗

k	length	char
10 % 6 = 4	6	d
4 % 5 = 4	5	c
4 % 2 = 0	2	b

⇒ 'b'

Code (HW)
