

**Maximum sliding window.** Given an array of integers  $arr$  and a sliding window of size  $k$  ( $k \leq n$ ), find maximum sliding window; sliding window starts from 0th index of the array and moves one step to the right side at each iteration.

$arr = [2 \quad 4 \quad 1 \quad 3 \quad 0 \quad 12]$

$k = 3$  (size of the window) 

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**Question:** How many window can we have with an array of size  $n$  and window size of  $k$ ?

$arr = [ \overset{0}{2} \quad \overset{1}{4} \quad \overset{2}{1} \quad \overset{3}{3} \quad \overset{4}{0} \quad \overset{5}{12} ]$ ;  $n = 6$ ;  $k = 3$ ;

Iteration

sliding window

1

$arr = [ \overset{0}{2} \quad \overset{1}{4} \quad \overset{2}{1} \quad \overset{3}{3} \quad \overset{4}{0} \quad \overset{5}{12} ]$

2	4	1
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2

$arr = [ \overset{0}{2} \quad \overset{1}{4} \quad \overset{2}{1} \quad \overset{3}{3} \quad \overset{4}{0} \quad \overset{5}{12} ]$

4	1	3
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3

$arr = [ \overset{0}{2} \quad \overset{1}{4} \quad \overset{2}{1} \quad \overset{3}{3} \quad \overset{4}{0} \quad \overset{5}{12} ]$

1	3	0
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4

$arr = [ \overset{0}{2} \quad \overset{1}{4} \quad \overset{2}{1} \quad \overset{3}{3} \quad \overset{4}{0} \quad \overset{5}{12} ]$

3	0	12
---	---	----

5

$arr = [ \overset{0}{2} \quad \overset{1}{4} \quad \overset{2}{1} \quad \overset{3}{3} \quad \overset{4}{0} \quad \overset{5}{12} ]$

0	12	
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out of index

It can be observed that with  $n = 6$  and  $k = 3$ , we are having  $4 (n - k + 1)$  sliding windows.

## Algorithm:

- keep one reference index

- Use one inner loop

- compare the reference node to each internal loop element which has the size of one window

- append the largest to the sliding window.

- Increment the outer loop reference by one after each complete inner loop completion.

```
def maxwindow(arr, n, k):
```

```
    window = []
```

```
    for i in range(n - k + 1):
```

```
        ref = arr[i]
```

```
        for j in range(i + 1, i + k):
```

```
            ans = max(ref, arr[j])
```

```
        window.append(ans)
```

```
    return ans
```