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K Sized Subarray Maximum

Difficulty: **Medium** Accuracy: **26.04%** Submissions: **349K+** Points: **4**

Given an array **arr**[] and an integer **k**. Find the **maximum** for each and every contiguous subarray of size **k**.

Examples:

Input: k = 3, arr[] = [1, 2, 3, 1, 4, 5, 2, 3, 6]
Output: [3, 3, 4, 5, 5, 5, 6]
Explanation:
1st contiguous subarray = [1 2 3] max = 3
2nd contiguous subarray = [2 3 1] max = 3
3rd contiguous subarray = [3 1 4] max = 4
4th contiguous subarray = [1 4 5] max = 5
5th contiguous subarray = [4 5 2] max = 5
6th contiguous subarray = [5 2 3] max = 5
7th contiguous subarray = [2 3 6] max = 6

Input: k = 4, arr[] = [8, 5, 10, 7, 9, 4, 15, 12, 90, 13]
Output: [10, 10, 10, 15, 15, 90, 90]
Explanation:
1st contiguous subarray = [8 5 10 7], max = 10
2nd contiguous subarray = [5 10 7 9], max = 10
3rd contiguous subarray = [10 7 9 4], max = 10
4th contiguous subarray = [7 9 4 15], max = 15
5th contiguous subarray = [9 4 15 12], max = 15
6th contiguous subarray = [4 15 12 90], max = 90
7th contiguous subarray = {15 12 90 13}, max = 90

Expected Time Complexity: O(n)
Expected Auxiliary Space: O(k)

Constraints:
$1 \le sizeof(arr) \le 10^6$
$1 \le k \le sizeof(arr)$
$0 \le arr[i] \le 10^9$

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Java (1.8) Start Timer

```java
//{ Driver Code Starts
// Initial template for JAVA

import java.io.*;
import java.lang.*;
import java.util.*;

public class Main {
    public static void main(String args[]) throws IOException {
        // taking input using class Scanner
        BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
        int t = Integer.parseInt(br.readLine());

        while (t-- > 0) {
            // taking total number of elements
            int k = Integer.parseInt(br.readLine());
            String line = br.readLine();
            String[] tokens = line.split(" ");

            // Create an ArrayList to store the integers
            ArrayList<Integer> array = new ArrayList<>();

            // Parse the tokens into integers and add to the array
            for (String token : tokens) {
                array.add(Integer.parseInt(token));
            }

            int[] arr = new int[array.size()];
            int idx = 0;
            for (int i : array) arr[idx++] = i;
            ArrayList<Integer> res = new Solution().max_of_subarrays(k, arr);
```

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