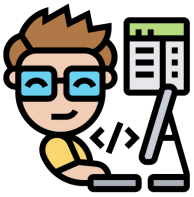

DAILY PROGRAMMING
CHALLENGE

WISDOM SPROUTS
IT Training Hub

Sliding Window Maximum

You are given an array of integers arr and a positive integer k. Your task is to find the maximum element in each sliding window of size k. The window slides from left to right, one element at a time, and you need to return the maximum element for each of these windows.

Input:

- An integer array arr of size n, where $1 \leq n \leq 10^5$
- An integer k, where $1 \leq k \leq n$

Output:

- An array of size $n-k+1$ containing the maximum element from each sliding window.

Examples:

- Example 1
  Input: arr = [1, 3, -1, -3, 5, 3, 6, 7], k = 3
  Output: [3, 3, 5, 5, 6, 7]
  Explanation:
  - The first window is [1, 3, -1] → Maximum = 3
  - The second window is [3, -1, -3] → Maximum = 3
  - The third window is [-1, -3, 5] → Maximum = 5
  - The fourth window is [-3, 5, 3] → Maximum = 5
  - The fifth window is [5, 3, 6] → Maximum = 6
  - The sixth window is [3, 6, 7] → Maximum = 7

Constraints:

- The elements of the array can be positive, negative, or zero.

Test Cases:

1. Input: arr = [1, 5, 3, 2, 4, 6], k = 3
   Output: [5, 5, 4, 6]
2. Input: arr = [1, 2, 3, 4], k = 2
   Output: [2, 3, 4]

3. Input: arr = [7, 7, 7, 7], k = 1
   Output: [7, 7, 7, 7]

Edge Cases:

1. Single Element Array: The array contains only one element
2. Window Size 1: The window size is 1, so each element is its own maximum
3. Array with All Same Elements: If all elements in the array are the same, the maximum for every window will be the same element.