CS23302 – Data Structures Laboratory

On the spot programs **Date : 24.09.2026**

1. In a standard array, a pair of indices (i, j) is considered "out of order" (or an **inversion**) if:

   1. i < j (the first element appears before the second element)
   2. (A[i] > A[j]) (the first element is strictly greater than the second element)

   Modify the merge algorithm such that to count how many `(i, j)` pairs are out of order while merging

2. Develop an algorithm to find the K-th largest element in given array of elements in O(nlog n).

3. implement three pivot choices (first element, last element, median-of-three) and count comparisons on a reverse-sorted input for each.

Median of three elements

1. Identify Three Elements: Locate the elements at the left index, the right index, and the middle index (calculated as floor value of (left + right) / 2)
2. Sort the Three Elements: Compare and sort these three specific elements in place so that (A[left] ≤ A[middle] ≤ A[right]).
3. Position the Pivot: Move the calculated median (now at the middle index) out of the way—traditionally by swapping it with the element at right.
4. Partition: Run the standard QuickSort partitioning loop on the remaining elements.