Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam - 603 110
(An Autonomous Institution, Affiliated to Anna University, Chennai)

UCS2403: DESIGN & ANALYSIS OF ALGORITHMS

Assignment 4

1. **Finding MAX using divide-and-conquer:** Using the technique of divide-and-conquer, write a recursive program to find the maximum value in a given (unsorted) list of numbers. Write the recurrence relation to find the time complexity of the algorithm. Find a closed form expression for the time complexity. Do NOT use built-in Python methods for finding MAX.

2. **Mergesort to count inversions:** Modify the algorithm of Mergesort to count inversions in a given list. Compare the time complexity of this algorithm against the time complexity of the code you wrote in Assignment 3 to compute the count of inversions.

3. **Finding the Maximum Subarray Sum:** Given a list A of size n, find the sum of elements in a subset A' of A such that the elements of A' are contiguous and has the largest sum among all such subsets. Please note that:

   - the subset should be having elements that are contiguous in the original list.
   - the input list may have negative values.
   - the algorithm should be based on divide and conquer strategy.

   Example:
   Input: A = [-2,1,-3,4,-1,2,1,-5,4]
   Output: 6
   Write the recurrence relation for the time complexity of your algorithm, and find a closed form expression for the same.