Assignment 5

1. The following assignment you can do as a group (maximum size: 4 students) or individually. Only one student from the group should upload the assignment at Google classroom. On the first page of submission, you have to clearly mention the names and roll numbers of students of the group. The assessment will be based on the novelty of the problem (how different the computation problem is from problems submitted by other groups.), how interesting the problem is, how elegantly you have written the problem statement, pseudocode, and analysis, how elegantly you implemented and analyzed the algorithms, and the viva voce. [Note: Once all students submit the assignment, we will upload all submitted assignments at Google classroom so that you can learn other computational problems that can be solved using the Divide and Conquer approach.]

   1.1. (T) Find a computational problem that you can solve using the divide and conquer approach. The problem should be different than the problems discussed in class, and it should be **unique** and **interesting**.

   1.2. (T) Write pseudocodes to design algorithms for the above mentioned computational problem using the brute-force approach (incremental approach) and the divide and conquer approach.

   1.3. (T) Analyze the time complexity of above algorithms. Analyze the divide and conquer algorithm using different methods such as (1) Recursion Tree Method (2) Iterative Method (3) Master Method (4) Substitution Method. Try to analyze the algorithm using as many methods as discussed above.

   1.4. (L) Provide the details of Hardware/Software you used to implement algorithms and to measure the time.

   1.5. (L) Implement the above algorithms and submit the code (complete programs).

   1.6. (L) Analyze the performance of both the implemented algorithms (performance of algorithms on your computers). Plot a graph.

   1.7. (L) Comparatively analyze the performance of above algorithms and plot a graph.