Tutorial Sheet – EVEN 2021
15B11CI411 – Algorithms and Problem Solving

Instructions

1. Tutorials in APS course would majorly be doubt removal sessions.
2. Students are advised to come prepared in tutorial by revising the lectures of that particular week so that doubts related to topics covered in that week are resolved.
3. Few practice questions will also be posted as Tutorial Sheet on your Google Classrooms. You can try solving them before the scheduled tutorial and discuss the doubts.
4. As tutorials will be purely problem solving based, always join the tutorial with a notebook and pen with you.
5. Whatever questions are discussed in tutorial, you are supposed to submit them on your respective classrooms every week.

Week 3 (1st February to 6th February 2021)
Recurrence Relations

1. Solve the following recurrences using Master method
   a) $T(n) = T(2n/3) + 1$
   b) $T(n) = 3T(n/4) + n \log n$
   c) $T(n) = 4T(n/2) + n^2$

2. Solve the following recurrence Relation using Recursion tree method
   a) $T(n) = 4T(n/2)+n$
   b) $T(n) =T(n/2)+T(n/4)+T(n/8)+n$

3. Solve the following recurrences using Iterative method
   a) $T(n) = 8T(n/2) + n^2$, $(T(1) = 1)$
   b) $T(n) = n.T(n-1)$ if $n>1$
      $=1$ if $n<=1$
   c) $T(n) = T(n/2) +c$ if $n>1$
      $=1$ if $n=1$

4. Consider a situation where swap operation is very costly. Which of the following sorting algorithms should be preferred so that the number of swap operations are minimized in general?
   a) Merge Sort b) Selection Sort c) Insertion Sort d) Heap Sort

5. Running merge sort on an array of size n which is already sorted is

   a) O(n) b) O(nlogn) c) $O(n^2)$ d) None

6. For merging two sorted lists of size m and n into sorted list of size m+n, we require comparisons of

   a) O(m) b) O(n) c) O(m+n) d) O(logm + logn)