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 1 (18th January to 23rd January 2021)
Review of Searching and Sorting Techniques

Q1) Use selection sort , insertion sort and bubble sort algorithms to sort the given arrays in ascending order. While you apply these algorithms, count the number of comparisons and number of swaps made by each algorithm for each of the array given below and fill them in table 1 and table 2. Comment on your observations and conclusions.

Array 1

index	0	1	2	3	4	5	6	7
value	90	80	70	60	50	40	30	20

Array 2

index	0	1	2	3	4	5	6	7
value	10	20	30	40	50	60	70	80

Table 1 : Number of Comparisons

	Array 1	Array 2
Selection Sort		
Bubble Sort		
Insertion Sort		

Table 2 : Number of Swaps

	Array 1	Array 2
Selection Sort		
Bubble Sort		
Insertion Sort		

Q2) Apply quick sort algorithm on below array containing 15 elements. Always take first element as the pivot element. Which case (Best/Worst) does this example represents?

8 1 3 2 6 5 7 *4* 12 9 11 10 14 13 15

Q3) Given the following list of numbers:

[21, 1, 26, 45, 29, 28, 2, 9, 16, 49, 39, 27, 43, 34, 46,40].

What will be the array after 3 recursive calls to merge sort?

Q4) Given a sorted array of integers, propose an efficient scheme for finding the first occurrence of a given number. Ex Input: Array = [2 4 4 4 8 8 10 10 10] , Target: 4 Output: Index of first occurrence of 4 is 1 .