Exercise: 10	SORTING & SEARCHING	08 – Nov - 2024

Observation (5 Marks)

1. List all sorting and searching algorithms
2. Differentiate internal sorting with external sorting.
3. Analyse quick sort and merge sort by master theorem
4. Analyse Linear Search and Binary Search by Master theorem.
5. Write the recurrence relation for
    a. Quick sort
    b. Merge Sort
    c. Linear Search
    d. Binary Search
6. Where in a min-heap might the largest element reside, assuming that all elements are distinct? Why?
7. Is an array that is in sorted order a min-heap? Why or why not?
8. Illustrate the operation of insert Item(7) on the heap A, assuming A is a min-heap: A = {2, 5, 10, 6, 8, 100, 11, 9, 15, 9, 10, 200, 101} Be sure to indicate all the swaps performed.
9. Write a brief note on priority queue.
10. Heapsort the following collection of (key,value) pairs

    (43,9.12),(34,5,12),(36,6,134),(102,123.09),(87,5.12),(43,12.90),(55,51.12),(31,1.134),

    Print the sorted list of key ,value pairs

Execution (15 Marks)

11. Implement and analyze Quick sort algorithm for the following array {52, 37, 63, 14, 17, 8, 6, 25}
12. Implement analyze merge sort algorithm for the same array
13. Illustrate the operation, step by step, of build Min Heap on the array A = {5, 3, 17, 10, 84, 19, 6, 22, 9} Do it for both the O(n lg n) approach that repeatedly inserts items and bottom-up O(n) approach. Are the heaps the same? If not, is it a problem?