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Total Number of Pages : 02

M.TECH

AR-17

M.TECH 1ST SEMESTER EXAMINATIONS(BACK), NOV/DEC 2019
CSE, MCSPC1020

ADVANCED DATA STRUCTURE AND ALGORITHM

Time: 3 Hours

Max Marks : 70

The figures in the right hand margin indicate marks.

PART-A

(10 X 2=20 MARKS)

1. Answer the following questions.

- a) The complexity of Bubble sort algorithm is
 - a. $O(n)$
 - b. $O(\log n)$
 - c. $O(n^2)$
 - d. $O(n \log n)$
- b) $T(n) = 9T(n/3) + n$, Solve the recurrence using master method?
- c) Which of the following data structure is linear data structure?
 - a. Trees
 - b. Graphs
 - c. Arrays
 - d. None of above
- d) In linear search algorithm the Worst case occurs when
 - a. The item is somewhere in the middle of the array
 - b. The item is not in the array at all
 - c. The item is the last element in the array
 - d. The item is the last element in the array or is not there at all
- e) What do you mean by trie?
- f) The Average case occur in linear search algorithm
 - a. When Item is somewhere in the middle of the array
 - b. When Item is not in the array at all
 - c. When Item is the last element in the array
 - d. When Item is the last element in the array or is not there at all
- g) What is the difference between B tree and B+ tree?
- h) State whether the following statements are true or false?
 - (i) The worstcase time complexity of AVL tree and binary search tree are same.
 - (ii) Graph Isomorphism problem is NP- Complete.
- i) When determining the efficiency of algorithm, the space factor is measured by
 - a. counting the maximum memory needed by the algorithm
 - b. counting the minimum memory needed by the algorithm
 - c. counting the average memory needed by the algorithm
 - d. counting the maximum disk space needed by the algorithm
- j) What is the time Complexity of matix chain multiplication is _____ and the time complexity of Strassen's multiplication is _____?

PART-B

(5 X 10=50 MARKS)

Answer any five questions from the following.

2. a) Discuss heap-Sort algorithm. [4]
b) Do heap-sort with the data given below.
85,76,93,55,57,105,28,115,205,67,85,100,110,125,150,155,70,75,95,160
Also discuss the time complexity of heap-sort. [6]
3. a) What do you mean by binomial heap? [2]
b) Form a binomial heap with the data given below?
1,3,14,9,5,7,15,12,11,18.
Also discuss the time complexity of merging, inserting and deleting an element
in a binomial heap? [8]
4. a) What do you mean by leftist heap? [2]
b) What is null-path-length? Discuss the operation of leftist heap briefly? [8]
5. a) What is AVL tree? [2]
b) Discuss L-R, L-L, R-R, R-L rotation briefly? Construct an AVL tree
with the given- data-: [8]
55,70,45,105,61,200,90,85,115,117,42,75,88,73,72
6. a) What is 2-3 tree? [2]
b) What is the advantage of 2-3 tree over normal binary tree? Discuss the
time Complexity of inserting, deleting an element in 2-3tree? [8]
7. a) Briefly discuss the fractional knapsack algorithm? [4]
b) Let 5 items are $\langle x_1, x_2, x_3, x_4, x_5 \rangle$ with weight $W \langle 10, 20, 30, 40, 50 \rangle$
and cost $V \langle 50, 120, 60, 120, 50 \rangle$ knapsack is 80. Find the optimal cost using fractional
knapsack algorithm. [6]
8. Write short notes on [5 X 2]
a) 3-SAT problem.
b) Tries.

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