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M.TECH

Total Number of Pages : 2

M.TECH 1ST SEMESTER SUPPLE EXAMINATIONS, DECEMBER 2018

ADVANCED DATA STRUCTURE AND ALGORITHM

Branch: CS, Subject Code:MCSPC1020

(Regulations 2017)

Time: 3 Hours

Max Marks : 70

Question Code: SD18002013

PART-A (10 X 2=20 Marks)

1. Answer the following questions.

- a) When determining the efficiency of algorithm, the space factor is measured by
 - i. counting the maximum memory needed by the algorithm.
 - ii. counting the minimum memory needed by the algorithm.
 - iii. counting the average memory needed by the algorithm.
 - iv. counting the maximum disk space needed by the algorithm.
- b) The complexity of Bubble sort algorithm is.
 - i. $O(n)$
 - ii. $O(\log n)$
 - iii. $O(n^2)$
 - iv. $O(n \log n)$
- c) If the values of a variable in one module is indirectly changed by another module, this situation is called
 - i. internal change
 - ii. inter-module change
 - iii. side effect
 - iv. side-module update
- d) What is the difference between divide and conquer method and dynamic programming?
- e) What is the disadvantage of greedy algorithm?
- f) What do you mean by tries?
- g) In linked list, which searching technique is better?
- h) What is the different between B tree and B+ tree?
- i) Two Main measures for the efficiency of an algorithm are _____.
- j) What is topological sorting?

PART-B (5 X 10=50 Marks)

Answer any five questions from the following.

2. a) Construct binary search tree for the data 8, 10, 3, 2, 1, 5, 4, 6, and 11. Insert an element 7 into binary search tree and balance the tree using AVL rotation. [5]
b) Explain how to implement AVL rotation using Binary Heap? Explain the insertion operation performed on binary heap, with an example. [5]
3. a) What do you mean by binomial heap? Form a binomial heap with the data given below? [5]
1, 3, 14, 9, 5, 7, 15, 12, 11, 18.
b) What is 2-3 tree? What is the advantage of 2-3 tree over normal binary tree? [5]
4. a) Write and solve a recurrence equation of the recurrence algorithm for Fibonacci series. [5]
b) Solve the following recurrence equation using recurrence tree method $T(s) = 2T(s/3) + 5s$ [5]



5. a) Determine an LCS of (1,0,0,1,0,1,0,1) and (0,1,0,1,1,0,1,1,0) and what is its complexity. [5]
b) Write and explain the Prim's algorithm. [5]

6. a) Design a recursive algorithm to search an element in a BST. [5]
b) How to derive the lower bounds from decision trees for sorting algorithms? Explain. [5]

7. a) Describe the insertion Process in a Red-Black tree. [5]
b) How to derive the lower bounds from decision trees for sorting algorithms? Explain. [5]

8. Write short notes on
a. convex-hull Problem [5]
b. Numerical Algorithm. [5]

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