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Printed pages: 2 **Sub Code: MTCS 102**

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M. TECH.

(SEM -I) THEORY EXAMINATION 2017-18

ADVANCED ALGORITHM

Time: 3 Hours ***Total Marks: 70***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

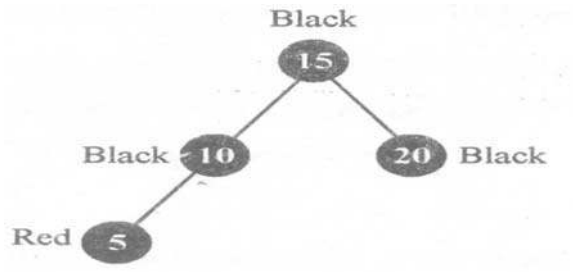
1. Attempt *all* questions in brief. **2 x 7 = 14**

a. What do you mean by asymptotic notation? Explain all the asymptotic notations.
b. Write the name of the Algorithm approach on which Merge sort works. What is its running time?
c. What is Approximation algorithm and approximation ratio?
d. Discuss one example of Greedy approach.
e. Differentiate between Dynamic and Divide and Conquer approach.
f. Write down design issue of parallel algorithm?
g. Define Cost optimality with example?

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a. Consider the following valid red –black where "R" indicates a red node, and "B" indicates a black node .Note that the black dummy sentinel leaf nodes are not shown. Show the resulting red-black tree after inserting key 3 into and deleting 15 from the original tree.



b. Write down Algorithm of Max Heapify .Write its Complexity.

c. What steps are used in Dynamic programming Approach? Discuss the 0/1 knapsack problem with respect to dynamic programming is greedy method equality applicable for the above problem?

d. Write and explain CRCW sorting with example.

e. What are P, NP, NPC and NPH problems? Explain with examples.

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SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

(a). Apply greedy approach to an activity-selection problem of scheduling several competing activities that require exclusive use of common resources, with a goal of selecting a maximum size set of mutually compatible activities.

(b) What is parallel searching? And also explain the CREW searching?

4. Attempt any *one* part of the following: 7 x 1 = 7

(a). What are the advantages of Red Black Tree over Binary Search Tree? Write algorithms to insert a key in a red black tree. Insert the following sequence of information in an empty red black tree 1, 2,3,4,5,5.

(b). Describe the depth first search and breadth first search algorithm with examples.

5. Attempt any *one* part of the following: 7 x 1 = 7

(a). What are the factors performance measures of Parallel Algorithm?

(b). Shown the results of inserting the keys F,S,Q,K,C,L, H,T,V,W, M,R,N in order into an Empty B-tree with minimum degree 2.

6. Attempt any *one* part of the following: 7 x 1 = 7

(a). Write Dijkstra's algorithm for single source shortest paths. How can it be used for solving all pairs shortest paths problem?

(b). Write the characteristics of B tree .Construct a B tree on following sequence of input.

1,2,3,4,5,6,7,11,13,15,12,16,17,18,19,20. Order **t=3**

7. Attempt any *one* part of the following: 7 x 1 = 7

(a). Write the CREW merging. Assume a CREW PRAM model with available number of processor p=4. It is required to merge A={2,3,4,6,11,12,13,15,16,20,22,24} and B={1,5,7,8,9,10,14,17,18,19,21,23} that r=s=12.

(b). Differentiate between Backtracking and Branch and Bound technique. Write an algorithm for Sum of subset using backtracking Approach. Find All possible solution for M=30 , write complete state space representation for given values.

S =< 1,2,5,7, 8 10, 15, 20, 25 >.

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