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13

B. E. / B. Tech DEGREE EXAMINATIONS, NOV 2013

FIFTH SEMESTER

INFORMATION TECHNOLOGY

IT 531 DESIGN AND ANALYSIS OF ALGORITHMS

Time: Three Hours

Answer *ALL* Questions

Max. Marks: 100

PART A (10 x 2 = 20)

1. Define the notations used for representing the upper bound time complexity of an algorithm.
2. What is the time complexity of a search operation in a Red-Black Tree?
3. Give the name of the sorting algorithm which has minimal space overhead for sorting n data objects.
4. What is the worst case time complexity of quick sort algorithm? When does it happen?
5. Compare dynamic programming with divide and conquer.
6. What is meant by amortized analysis?
7. What is the advantage with string matching with finite automata?
8. How the residual network of any flow network is defined?
9. Define the subset sum problem? Give an example.
10. What are NP-Complete problems?

PART B (5 x 16 = 80)

11. i. Explain masters method for the recurrence evaluation.
ii. Construct a Red-Black tree from the following integers.

10, 45, 80, 34, 67, 28, 53, 60, 19, 6, 23, 71

12. a. Explain the heap sort algorithm and sort the following integers using heap sort.

10, 45, 80, 34, 67, 28, 53, 60, 19, 6, 23, 71

(OR)

b. Using quick sort algorithm sort the following list of values. Write the recursive quick sort algorithm.

10, 45, 80, 34, 67, 28, 53, 60, 19, 6, 23, 71

13. a. Explain the dynamic programming solution for the matrix chain problem. Solve the following problem with six matrices.

$A_1(30 \times 35)$, $A_2(35 \times 15)$, $A_3(15 \times 5)$, $A_4(5 \times 10)$, $A_5(10 \times 20)$, $A_6(20 \times 25)$

(OR)

b. Explain the greedy approach for finding Huffman codes from the given list of symbols and their respective frequencies.

14. a. Explain the Ford Fulkerson method for solving maximum flow problem.

(OR)

b. Explain the KMP algorithm for pattern matching.

15. a. Explain the vertex cover problem.

(OR)

b. Explain the travelling salesman problem.