B.E/B.TECH. DEGREE EXAMINATIONS: NOV/DEC 2010

Third Semester

CSE104: DESIGN AND ANALYSIS OF ALGORITHMS

(Common to Computer Science and Engineering & Information Technology)

Time: Three Hours   **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. Algorithm is a

   a) Sequence of complex instruction   b) Sequence of unambiguous instruction

   c) Sequence of erroneous instruction   d) Sequence of ambiguous instruction

2. Algorithm designed to be executed on machines that execute operations concurrently are called

   a) Sequential algorithm   b) Exact algorithm

   c) Parallel algorithm   d) Approximation algorithm

3. The basic operation of element uniqueness problem is

   a) Outer loop iteration   b) Comparison

   c) Inner loop iteration   d) Return statement

4. The order of growth of element uniqueness problem is

   a) $n(n-1)/2$ b) $n(n-1)$ c) $n/2$ d) n^2

5. Straight forward approach for solving a problem is called _____ method

   a) Divide-and -Conquer   b) Brute-force

   c) Decrease-and-Conquer   d) Transform-and- Conquer

6. A node in a state space tree corresponds to a node that still lead to a complete solution is known as,

   a) promising node   b) child node   c) non-promising node   D) root node

7. To minimize or maximize an objective function is an,

   a) subset sum problem   b) optimization function

   c) assignment problem   d) approximation function

8. A rooted tree whose nodes represent partially constructed solutions to the problem is

   a) a state-space tree   b) AVL tree   c)binary tree   D) Heap structure

9. The mode value in an array is,

   a) the largest frequency of a number   b) the largest number

   c) the smallest frequency of a number   d) the smallest number

10. The balance factor of an AVL tree is the,

   a) difference between the heights of the node's left and right subtrees

   b) height of the left subtree

   c) height of the right subtree

   d) height of tree

PART B (10 x 2 = 20 Marks)

11. Define a heap. Draw a heap with six nodes.
12. Define time complexity.
13. Write about Big Oh notation.
14. Explain the worst case running time of the quick sort algorithm.
15. Write an algorithm to find the maximum in a list of numbers.
16. Compare the advantages, when lists of 'n' numbers are represented using
    (i) an arrary
    (ii) a linked list
17. When is a connected graph said to be biconnected.
18. State the knapsack problem.
19. Define a weighted digraph. Draw one with three vertices.
20. Write about greedy technique.

PART C (14 X 5 = 70 Marks)

21. a) Write about the fundamentals of analysis of algorithm.   **(OR)**
    b) Write about various asymptotic notations and also explain the idea of basic efficiency
       classes.

22. a) Give the algorithm to determine the Fibonacci series using recursion. Explain its time
       complexity.   **(OR)**
    b) Discuss about the general plan for empirical analysis of algorithm efficiency.

23. a) Write the complete quick sort algorithm and analyse its average case behaviour.
                                      (OR)
    b) Explain the standard ways of traversing a graph with example.

24. a)Write the algorithm for Heap sort and explain it with neat example.   **(OR)**
    b) Explain the Prim's algorithm with neat example and write the worst case time complexity
       of the algorithm.

25. a) Explain backtracking with any two examples.   (OR)
    b) Explain Branch and Bound technique in detail with any two examples.

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