ANNA UNIVERSITY COIMBATORE

B.E. / B.TECH. DEGREE EXAMINATIONS : JUNE 2009

REGULATIONS : 2007

FOURTH SEMESTER

070230017 - DESIGN AND ANALYSIS OF ALGORITHMS

(COMMON TO COMPUTER SCIENCE AND ENGG./ INFORMATION TECHNOLOGY)

TIME : 3 Hours Max.Marks : 100

PART – A

(20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

1. Define a pseudocode with respect to a programming environment.
2. State Graph coloring problem.
3. Distinguish time efficiency and space efficiency of an algorithm.
4. How do you calculate the worst-case efficiency of an algorithm that has an input of size n?
5. List the general constraints of measuring efficiency in nonrecursive algorithms.
6. Define recurrence relations.
7. How does method of back substitutions function?
8. State Cassini's identity for Fibonacci series.
9. How do you define brute force technique?
10. Mention the environment of convex-hull problem.
11. State the impact of divide-and-conquer over Strassen's algorithm.
12. Name the variations of decrease-and-conquer with respect to various problem domains.
13. Give one example for instance simplification.
14. Locate any two applications of Guassian elimination.
15. State principle of optimality.
16. Trace the use of a Huffman tree in information security.

17. Differentiate the characteristics of backtracking and branch-and-bound approaches.
18. Devise a formula to track the path in a state-space tree.
19. Valuate the efficiency of bisection method and false position method with respect to any nonlinear equation on your own.
20. Mention an example on NP-hard problems.

PART – B

(5 x 12 = 60 MARKS)

ANSWER ANY FIVE QUESTIONS

21. Indicate through proper steps how the ADT priority queue can be implemented as (i) an unsorted array (ii) a binary search tree.

22. Prove that the exact number of additions made by the recursion algorithm BinRec(n) for an arbitrary positive decimal integer n is $\log_2 n$.

23. Design a recursive algorithm for computing 2^n for any non-negative integer n which is based on the formula: $2^n = 2^{n+1} + 2^{n-1}$.

24. Give an example of the assignment problem whose optimal solution does not include the smallest element of its cost matrix.

25. Explain how one can find point P_{max} in the quickhull algorithm analytically.

26. Write a program in C/C++ for constructing a 2-3 tree for a given list of n integers.

27. Apply Kruskal's algorithm to find a minimum spanning tree of any graph that contains exactly 7 vertices and trace the time complexity.

28. State and solve 8-Queen's problem using backtracking.

********THE END********