

II B.Tech II Semester(R05) Supplementary Examinations, January 2010
DESIGN AND ANALYSIS OF ALGORITHMS
 (Computer Science & Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. (a) Consider a polynomial in n of the form

$$f(n) = \sum_{i=0}^m a_i n^i = a_m n^m + a_{m-1} n^{m-1} + \dots + a_2 n^2 + a_1 n + a_0$$
 where $a_m > 0$ then $f(n) = \Omega(n^m)$
 (b) Differentiate between profiling and debugging. [10+6]

2. (a) Suppose a binary tree has leaves $\ell_1 \ell_2 \dots \ell_m$ at depths d_1, d_2, \dots, d_m respectively prove that $\sum_{i=1}^m 2^{-d_i} \leq 1$ and determine when the equality is true.
 (b) Write and explain the control abstraction algorithm of divide and conquer. [8+8]

3. (a) Write a greedy algorithm to the Job sequencing with deadlines.
 (b) Prove that the edge with the smallest weight will be part of every minimum spanning tree. [8+8]

4. Write a pseudocode of the dynamic programming algorithm for solving Optimal Binary search tree and determine its time and space efficiencies. [16]

5. (a) Write a pseudocode for finding the strongly connected components of directed graph. Also analyze its time complexity.
 (b) Explain the Inorder traversal of a tree with an example. [8+8]

6. (a) Draw and explain the portion of the tree for 4-queens problem that is generated during backtracking.
 (b) Explain the applications of Backtracking. [10+6]

7. (a) What is Bounding? Explain how these bound are useful in Branch and Bound methods.
 (b) Describe the TSP in Branch and Bound. [8+8]

8. (a) Write the Nondeterministic sorting algorithm. Also Analyze its complexity.
 (b) Distinguish between deterministic and non-deterministic algorithms. [10+6]
