

**II B.Tech II Semester Supplementary Examinations,
November/December 2005
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) Compute time complexity of recursive Fibonacci procedures where
 $F(n) = F(n-1) + F(n-2)$
 (b) What does the following procedure outputs? Compute $F1(1)$, $F1(2)$, $F1(3)$, $F1(4)$.

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pfProcedure F1(n)
1.pfif n < 2 pfthen return (n)
pfelse return (F2(2,n,1,1))
pfendif
pfend F1

pfprocedure F2(I, n, x, y)
pf if  $I \leq n$ 
pfthe call F2 (I+1, n, y, x+y)
pfendif
pfreturn(y)
pfend F2
```

[8+8]
2. (a) The worst-case time of procedure MERGESORT is $O(n \log n)$. What is its time in the best case? Can we say that the time for merge sort is $\theta(n \log n)$? [10]
 (b) What is a STABLE SORTING Method? Is merge sort a stable sorting method? [6]
3. (a) Explain the control at straction of Greedy method compare this with Dynamic programming. [4]
 (b) Applying the Greedy stentegy find the solution for optimal storage on tapes problem instance $n = 3, (l_1, l_2, l_3) = (5, 10, 3)$. [6]
 (c) Explain the 0/1 knap sack problem algorithm with Greedy concept. [6]
4. Use an AVL tree as the basis of an algorithm to execute MIN, UNION, and DELETE on sets consisting of integers 1 through n, using $O(\log n)$ steps per operation. . [16]
5. (a) Explain the differences between Greedy and Dynamic programming method of problem solving techniques.
 (b) Prove that algorithm for construction of an optimal binary search tree requires $O(n^3)$ time. [6+10]

6. Write a non recursive algorithm for postorder traversal of a binary tree T. Each node has four fields: LCHILD, DATA, PARENT, RCHILD. [16]
7. Present a program schema for a FIFO branch and bound search for a Least - Cost answer node. [16]
8. (a) Devise an algorithm, which accepts a number in decimal and produces the equivalent number in binary. What is its time complexity?
(b) Devise an algorithm, which performs the inverse transformation of the above problem. [8+8]
