III B.Tech I Semester Regular Examinations,Nov/Dec 2009
DESIGN AND ANALYSIS OF ALGORITHMS
Computer Science And Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Explain the Prim's algorithm with the appropriate example.

   (b) Write the Prim's algorithm to find the minimum spanning tree.   [8+8]

2. (a) Describe some classic NP problems and why they are important.

   (b) Write about tractable and intractable problems.   [8+8]

3. (a) Modify the Binary search of the text so that in the case of unsuccessful search it returns the index i such that k(i) < key<k(i+1).

   (b) Is Quick sort a stable sorting method? Justify your answer.   [8+8]

4. Show that the relation "V and W lie in the same biconnected component of G" is not an equivalence relation.   [16]

5. Write an algorithm schema FifoBB for a FIFO branch-and-bound search for a least-cost answer node.   [16]

6. With a numerical example, explain Dynamic Partitioning Scheme that can be adopted in solving 0/1 Knapsack Problem using Back tracking method.   [16]

7. (a) Given a sequence of n real numbers A(1), ..., A(n), write a procedure to determine a contiguous subsequence A(i),,A(j) for which the sum of elements in the subsequence is maximized.

   (b) You are given n types of coin denominations of values $v(1) < v(2) < ....v(n)$ (all integers). Assume $v(1) = 1$, so you can always make change for any amount of money C. Give an algorithm which makes change for an amount of money C with as few considerations as possible.   [8+8]

8. Let a,b,c be numbers such that $0\leq$ a,b<1, and c> 0. Let T(n) be defined by T(n)=T(an)+T(bn)+ cn.

   (a) Show that if (a+b) < 1 then T(n) is bounded by linear function.

   (b) Does there exist a d such that, for all a,b,c above,T(n)= $O(n^d)$?   [16]

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