B.Tech 6th Semester (CSE) F-Scheme Examination,
May–2017

ANALYSIS AND DESIGN OF ALGORITHMS

Paper-CSE-306-F

Time allowed : 3 hours] *[Maximum marks : 100*

Note :** Attempt **five** questions with at least **one** question from each section. **Question No. 1 is compulsory.

1. (a) Explain Asymptotic notation in detail.

(b) Differentiate between greedy and dynamic techniques.

(c) Derive relationship between P and NP.

(d) What is dominance rule ? Explain with example. 5×4=20

Section-A

2. (a) Explain time & space complexity in detail. 10

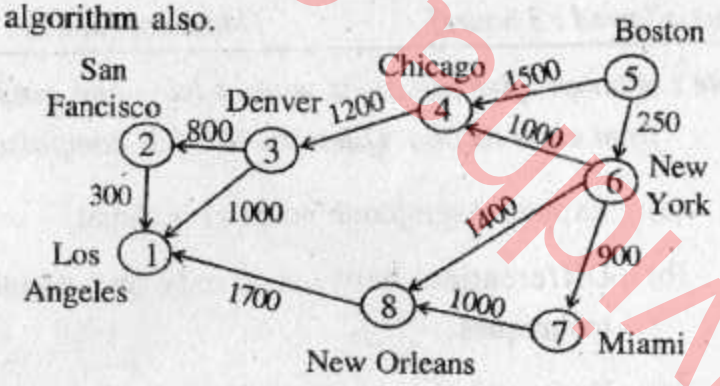
(b) Write quick sort algorithm with example and its complexity's analysis. 10

3. (a) What are graphs ? Write about different graph representations with proper diagrams. 10

(b) State and analyse Strassen's matrix multiplication algorithm. 10

Section-B

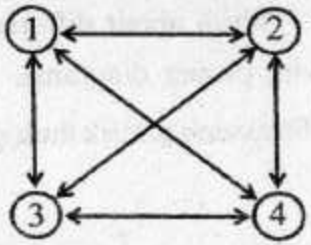
4. Explain the following single source shortest path problem where source is node 5 and destination is node 1 using Greedy method. Write and analyse its algorithm also.



20

5. (a) Consider the o/1 Kuapsack instance where the no. of items are n=3, max capacity m=6 and $(w_1, w_2, w_3) = (2, 3, 4)$ respective $(P_1, P_2, P_3) = (1,2,5)$. Find the optimal solution using dynamic programming. 10

(b) Solve the following dynamic programming problem : 10



$$\begin{bmatrix} 0 & 10 & 15 & 20 \\ 5 & 0 & 9 & 10 \\ 6 & 13 & 0 & 12 \\ 8 & 8 & 9 & 0 \end{bmatrix}$$

Section-C

6. (a) Explain Backtracking. Write also for 8-queues problem with its complexity. 10

(b) Write short note on Graph coloring and Hamiltonian cycle. Tell another method by which these problems can be solved. 10

7. (a) Explain lower bounds on parallel computations. 10

(b) Solve the following problem by using LC branch and bound method :

Knapsack instance n=4, p(1:4)=(10,10,12,18) & weight w (1:4) = (2,4,6,9) & max. capacity m=15. 10

Section-D

8. Write short note on :

(a) Show CDP is NP complete

(b) P $\subseteq$ NP

(c) Node cover problem in NP-complete.

(d) Prove DHC is NP hard. 5×4=20

9. (a) What are non-deterministic algorithm and write one for the maximum clique problem. 10

(b) State & explain Cook's theorem. 10