Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No .....

IT-3002 (CBGS)

B.E., III Semester

Examination, December 2017

Choice Based Grading System (CBGS)

Analysis and Design of Algorithm

Time : Three Hours ***Maximum Marks : 70***

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Assume suitable data if missing.

1. a) Explain various asymptotic methods used to represent the rate of growth of running time of algorithms.
   b) Write an algorithm to search an item in a linear list. If there are n nodes in the list, what is the running time of your algorithm.

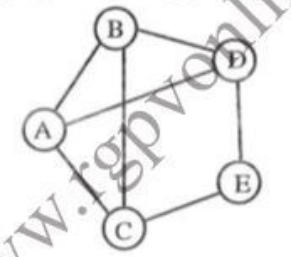
2. a) Explain a search procedure using divide and conquer technique. Prove that the procedure works correctly. Give the time complexity of the algorithm.
   b) Explain matrix multiplication using divide and conquer.

3. a) Derive the recurrence relation for Fibonacci series algorithm using divide and conquer? Also, carry out the time complexity analysis.
   b) Differentiate between greedy approach and dynamic programming approach to solve a problem.

4. a) Consider the knapsack instance n = 3, $(w_1, w_2, w_3) = (2, 3, 4)$, $(p_1, p_2, p_3) = (1, 2, 5)$ and $m = 6$. Explain 0/1 knapsack problem to solve above instance.
   b) Write and explain an algorithm to find all pair shortest paths problem.

5. a) Explain the characteristics of a problem that can be solved efficiently using Dynamic programming technique.
   b) What is multistage graph? Explain with example, write a pseudocode for finding minimum cost path in given multistage graph.

6. a) Describe the detail about the back-tracking solution of 8 queens problem.
   b) Explain graph coloring problem using following example.



7. a) Describe how branch and bound techniques is used to solve 0/1 knapsack problem.
   b) Briefly explain NP-hard and NP-completeness with suitable example.

8. Write a short notes on any three :
   a) Huffman codes
   b) Lower bound theory
   c) Hamiltonian cycle
   d) Minimum Spanning tree

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175