PVP 14

Code: CS4T2

II B.Tech - II Semester – Regular Examinations – May 2016

DESIGN AND ANALYSIS OF ALGORITHMS
(COMPUTER SCIENCE AND ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11x 2 = 22 M

1. a) What are the characteristics of an algorithm?
   b) Define 0/1 knapsack problem.
   c) What are implicit and explicit constraints in back tracking?
   d) Write down applications of branch and bound algorithm.
   e) Explain the relation between P and NP problems.
   f) Give an example showing that Quicksort is not a stable sorting algorithm.
   g) Differentiate between greedy method and Dynamic programming.
   h) Which data structure is to be implemented to improve the time complexity Kruskal's algorithm ?
   i) What is a Hamiltonian cycle?
   j) What is the worst case complexity of merge sort?
   k) What is a spanning tree?

PART – B

Answer any ***THREE*** questions. All questions carry equal marks. 3 x 16 = 48 M

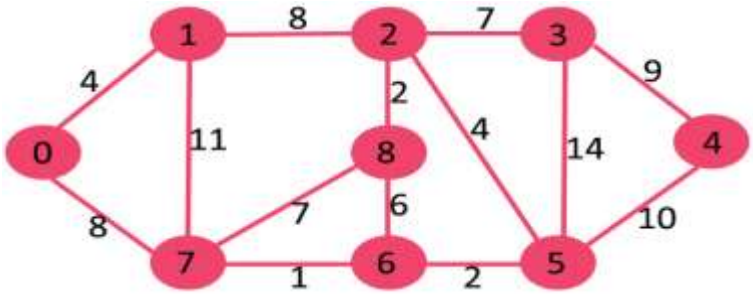
2. a) Explain the various Asymptotic notations used in algorithmic analysis with examples. 10 M

b) Write an algorithm to find the factorial of a number and find the time complexity of the algorithm. 6 M

3. a) Write the control abstraction for Divide and Conquer method. 4 M

b) Sort all the following elements using quick sort
5 3 1 9 8 2 4 7 and discuss the worst case and best case complexities of quick sort. When do the quicksort process gives worst case complexity. 12 M

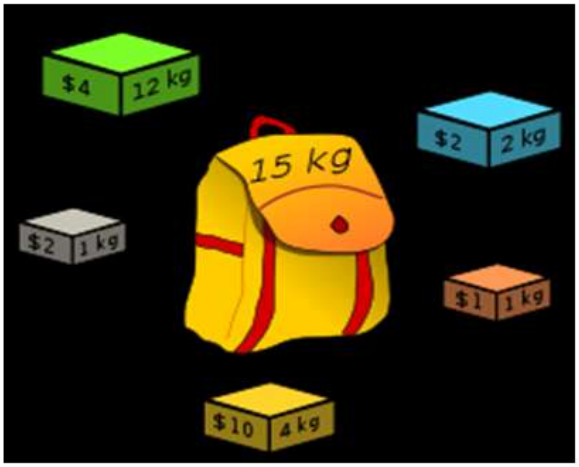
4. a) Using Dijkstra's algorithm find the shortest path from source 0 to 4 and explain with all the steps.
10 M



b) Write an algorithm for kruskal's minimum spanning tree and explain with an example. 6 M

5. a) Write the general method for dynamic programming and give one example problem that can be solved with dynamic programming concept. 6 M

b) Which boxes should be chosen to maximize the amount of money while still keeping the overall weight under or equal to 15 kg? 10 M



6. a) Explain P, NP, NP hard and NP complete class problems with examples. 8 M

b) Let w = {2,4,6} and m=6. Find all possible subsets of w that sum to m. Do this using Sum of Subsets. Draw the state space tree that is generated. 8 M