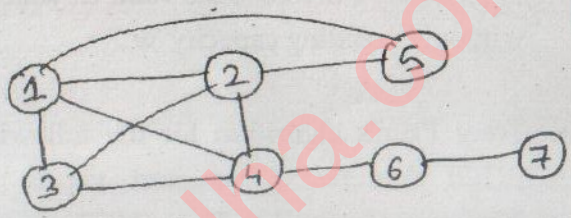
(b) Explain transitive closure using dynamic approach. 7

SECTION – C

6. (a) Explain Branch-and-Bound strategy to solve TSP for any graph & analyze complexity for the same. 10

(b) Find all Hamiltonian Cycles in following graph using Backtracking : 10



7. (a) Give an algorithm for graph coloring problem using Backtracking & find its complexity. 10

(b) Explain how Inserting an element in Binary search Tree is done. Write an algorithm for it and give suitable example. 10

SECTION – D

8. State and explain Cook's theorem. 20

9. (a) Define NP-Complete problem with example. 10

(b) Discuss Node cover decision problem. 10

Roll No. .....

24362

B. Tech 6th Semester (CSE)

Examination – May, 2016

ANALYSIS AND DESIGN OF ALGORITHMS

Paper : CSE-306-F

Time : Three Hours] *[Maximum Marks : 100*

Before answering the question, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question no. 1 is *compulsory*. Attempt atleast *one* question from each Section.

1. (a) Show that $(n+1)^5$ is $O(n^5)$. 2

(b) What do you mean by time complexity and space complexity of an algorithm ? 2

(c) Using big-O notation, state time and space complexity of merge sort. 2

(d) Explain how greedy paradigm of algorithm differs from that of Dynamic programming. 2

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(e) Solve the following recurrence relation : 2

$T(n) = T(n-2) + n, n > 1$

$T(o) = C$

$T(1) = d$

(f) For a problem P, if we are given an Input '1' and a possible answer 'A', and we find a way to verify whether or not 'A' really is a valid answer to P given '1', then what kind of problem is P ? 2

(g) Explain general backtracking method. 4

(h) Describe recursive relations. 4

SECTION – A

2. (a) Explain Binary search with suitable example and finds its complexity in best, average & worst case. 7

(b) Sort the following using Heap sort : 13

17, 7, 19, 8, 1, 24, 28, 31, 10, 33

Calculate its complexity. Also calculate its running time complexity is list is already sorted.

3. (a) Explain the Quick sort Algorithm and compare its time complexity with merge sort. 12

(b) Explain Divide and conquer strategy to find optimal solution to the problem. Explain type of problems it is applied. 8

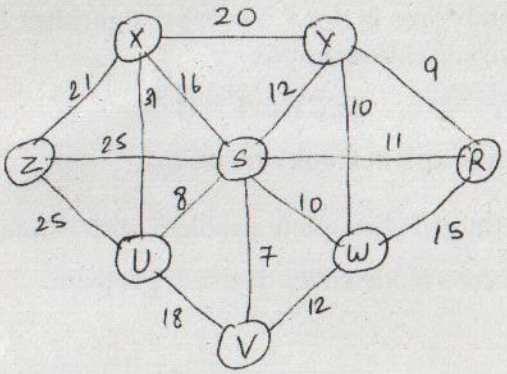
SECTION – B

4. (a) Explain greedy approach for algorithm design ? Devise a solution for fractional knapsack using greedy approach. Give its time complexity. 8

(b) Write a dynamic programming algorithm for 0/1 knapsack problem. Algorithm should take 2 arrays : 12

One giving size of each of 'n' items & second giving value of each of items and size of knapsack 'w'. You have to maximize value in your knapsack without exceeding capacity 'w'.

5. (a) Trace Prim's algorithm for the following graph (PTO) Assume 'X' as start vertex. Compare Minimum Spanning Tree (MST) produced by Prim's algorithm with MST produced by kruskal's. State their time complexities. 13



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