

Printed Pages: 4

691

NCS-501

(Following Paper ID and Roll No. to be filled in your  
Answer Book)

Paper ID : 110501

Roll No.

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B. Tech.

(SEM. V) THEORY EXAMINATION, 2015-16

DESIGN AND ANALYSIS OF ALGORITHM

[Time:3 hours]

[Maximum Marks:100]

## Section-A

**Note :** All questions are *compulsory*

1. Attempt **all** parts . All parts carry **equal** marks. Write answer of all part in short . (2x10=20)
  - (a) Justify why Quick sort is better than Merge sort ?
  - (b) What is priority queue ?
  - (c) Find out Hamiltonian cycles in complete graph having 'n' vertices.
  - (d) Explain binomial heap with properties.
  - (e) Explain element searching techniques using divide and conquer approach.

- (f) Find the subsets-of sum of following problem. Given total elements are  $(S)=\{4,2,7,6,8\}$  and maximum SUM is  $(X)=8$ .
- (g) Explain dynamic programming. How it is different from greedy approach ?
- (h) Solve the given recurrence  $T(n)=4T(n/4)+n$
- (i) Differences back tracking and branch & bound programming approach.
- (j) Explain the P, NP and NP- complete in decision problems.

### SECTION-B

Note: Attempt any **five** questions from this section. (10x5=50)

2. Explain insertion in Red Black Tree. Show steps for inserting 1, 2, 3, 4, 5, 6, 7, 8 & 9 into empty RB tree.
3. Discuss knapsack problem with respect to dynamic programming approach. Find the optimal solution for given solution for given problem, w (weight set) = {5, 10, 15, 20} and W (Knapsack size) = 8.
4. What is heap sort ? Apply heap sort algorithm for sorting 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Also deduce time complexity of heap sort.

5. Explain B-Tree and insert elements B, Q, L, F into B-Tree [Fig:1] then apply deletion of elements F, M, G, D, B on resulting B-Tree.

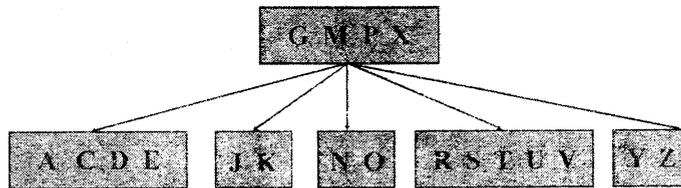


Fig. 1

- Q6. Write an algorithm for solving n-queen problem. Show the solution of 4 queen problem using backtracking approach.
- Q7. Explain a greedy single source shortest path algorithm with example.
- Q8. What is string matching algorithm? Explain Rabin-Karp method with examples.
- Q9. Explain Approximation algorithms with suitable examples.

### SECTION-C

Note: Attempt any **two** questions from this section. (15x2=30)

10. What is Fibonacci heap? Explain CONSOLIDATE operation with suitable example from Fibonacci heap.

11. What is minimum spanning tree ? Explain Prim's Algorithm and find MST of graph [Fig:2]

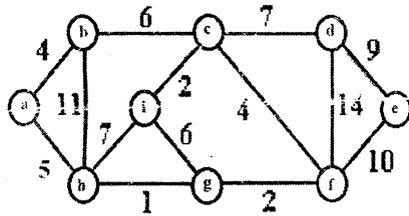


Fig: 2

12. Explain TSP (traveling sales person) problem with example. Write an approach to solve TSP problem.

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