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

Paper ID : 110501   Roll No. | | | | | | | | | | |

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.
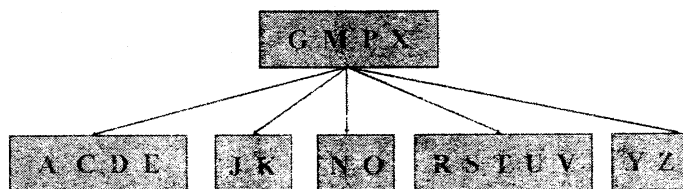

Fig. 1

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 fro Fibonacci heap.

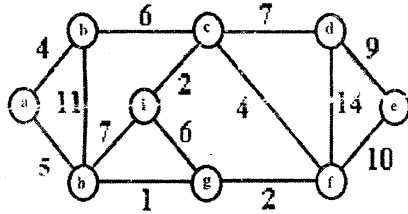11. What is minimum spanning tree ? Explain Prim's Algorithm and find MST of graph [Fig:2]

Fig: 2

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

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