635

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BICS-014

B.Tech. - VIEP - COMPUTER SCIENCE AND ENGINEERING (BTCSVI)

Term-End Examination, 2019

BICS-014 : DESIGN AND ANALYSIS OF ALGORITHM

Time : 3 Hours] **[Maximum Marks : 70**

Note : Attempt **any seven** questions. All questions carry equal marks.

1. (a) What is amortized analysis ? Discuss the potential method of amortized analysis with suitable example. [5]

   (b) What is Vertex Cover problem ? Prove that Vertex Cover problem is NP-complete. [5]

2. (a) Write Strassen's matrix multiplication algorithm. Calculate the time complexity of Strassen's matrix multiplication algorithm. [5]

   (b) What are Greedy algorithms ? Define fractional Knapsack problem. [5]

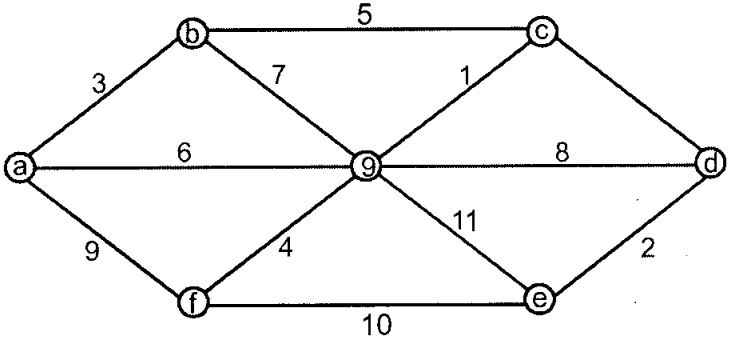
3. Write Quick Sort algorithm. Apply the algorithm to sort the sequence given below :

5, 22, 3, 7, 11, 16.

Calculate the best case and worst case time complexity of Quick Sort algorithm and verify the statement "Best Case for Bubble Sort is Worst Case for Quick Sort" [10]

4. Discuss the P, NP, CO-NP, NP- complete and NP-Hard Problem with suitable example for each. [10]

5. What is a spanning tree ? How it is different from a graph ? Write Kruskal's Algorithm for minimum spanning tree. Apply this algorithm on the graph given below : [10]



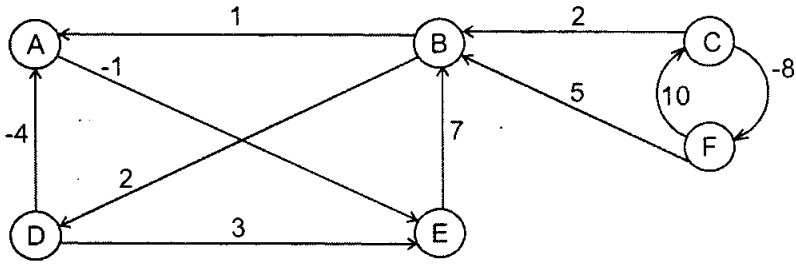
6. (a) What are Probabilistic Algorithms ? Discuss the utility of Probabilistic Algorithms with suitable example. [5]

(b) What is Eight Queen's problem ? Discuss the randomized solution for Eight Queen problem. [5]

7. (a) What is Huffman Coding ? Discuss the usage of Huffman coding as data compression technique. Give suitable example in your discussion. [7]

(b) What is a Binary Search tree ? How it is different from Binary Tree ? [3]

8. Write Floyd-Warshall's algorithm. Apply it to find the shortest path for the graph shown below : [10]



9. (a) What do you understand by Hashing ? Why Hashing is required ? List the methods used for hashing. [5]

(b) Write CYK algorithm. Discuss areas of application of CYK algorithm. [5]

10. Write short notes on the following : [2.5×4=10]

(a) Knuth - Morris - Pratt algorithm

(b) Dynamic Programming

(c) Approximate Algorithms

(d) Miller Rabin Test

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