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**Question Paper Code: 31482**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Information and Technology

01UIT402 - ANALYSIS AND DESIGN OF ALGORITHMS

(Regulation 2013)

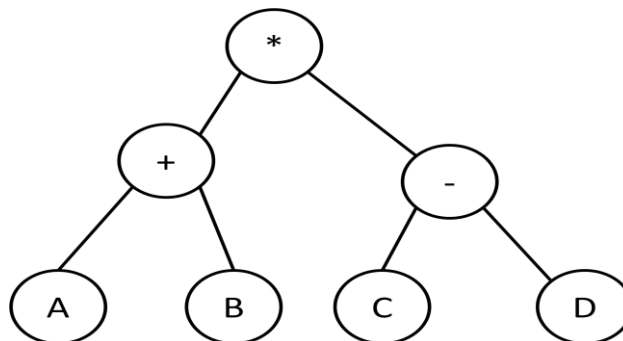
Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Draw the graph to represent Big oh(O), Omega( $\Omega$ ) and Theta( $\theta$ ) time complexity of an algorithm.
2. List different problem types with an example.
3. Write the recursive module to find Fibonacci number series.
4. Define algorithm visualization.
5. How divide and conquer strategy generally decreases the time complexity?
6. Show all binary search tree traversal of the given expression tree.



7. Do height balancing of binary search tree while inserting the following elements 23, 7, 6, 44, 55, 32.
8. Construct Huffman tree for the following characters

Character	Frequency
a	15
b	13
e	5
t	3
i	2

9. State the working principles of branch and bound algorithm.
10. How Hamiltonian circuit related to travelling salesman problem?

PART - B (5 x 16 = 80 Marks)

11. (a) Explain the frame work of algorithm analysis. (16)

Or

- (b) How asymptotic notations are useful for measuring complexities? (16)

12. (a) Analyze the algorithm to find minimum element in a binary search tree with recursive and non recursive implementation. (16)

Or

- (b) Explain empirical analysis of algorithms with examples. (16)

13. (a) (i) Write the bubble sort algorithm such that smallest element bubbled up to the first location and analyze its efficiency. (8)

- (ii) Write the algorithm of quick sort and show the iterative steps of quick sort for the elements 13, 44, 12, 5, 15, 7, 3. (8)

Or

- (b) (i) Analyze the brute force string matching algorithm with an example. (8)

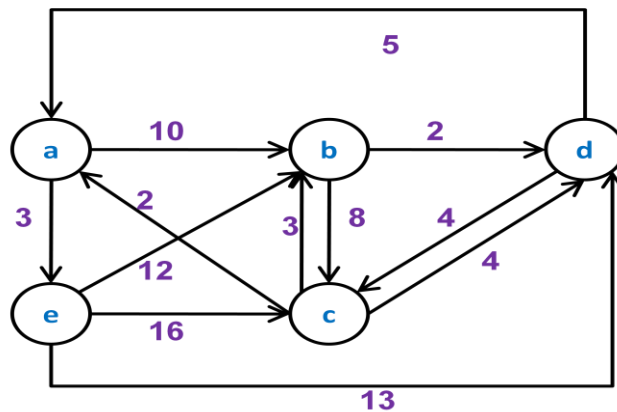
- (ii) Compare between depth first search and breath first search with an example. (8)

14. (a) (i) Write the Kruskal's algorithm for minimum spanning tree and analyze its time complexity. (8)

(ii) How dynamic programming helps to construct optimal binary search trees? Explain. (8)

Or

(b) Given a directed graph whose edges have positive weights, use Dijkstra's algorithm to find the shortest path between a given source 'a' and all destinations. (16)



15. (a) (i) How to place 4 Queens' in a 4\*4 matrix using backtracking concept? (8)

(ii) Is subset sum is NP complete? Justify the answer. (8)

Or

(b) Solve the given knapsack problem using greedy technique,  $n = 3$ ,  $m = 20$ ,  $(p_1, p_2, p_3) = (25, 24, 15)$ ,  $(w_1, w_2, w_3) = (18, 15, 10)$  and analyze algorithm time complexity. (16)

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