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Reg. No. :

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Fifth Semester

Information Technology

15UIT504- ANALYSIS AND DESIGN OF ALGORITHMS

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Which of the following is not the required condition for binary search   CO1- R
   algorithm?

   (a) The list must be sorted

   (b) There should be the direct access to the middle element in any sub-list

   (c) There must be mechanism to delete and/or insert elements in list

   (d) none of above

2. The Merge Sort uses   CO2- R

   (a) Divide and Conquer strategy   (b) Greedy   (c)Array   (d) Link List

3. The minimum number of edges required to create a cyclic graph of n   CO3- R
   vertices is

   (a) n   (b) n+1   (c) n-1   (d) 2n

4. The term _____ refers to all state space search methods in   CO4- R
   which all the children of the nodes are generated before any other live
   node can become the E-node

   (a) Backtracking   (b) Depth First Search

   (c) Branch and bound   (d) Breadth First Search

5. Which of the following algorithm uses pointer doubling concept   CO5 R

   (a) Dijikstra's algorithm   (b) List ranking algorithm

   (c) Floyd's algorithm   (d) Kruskal's algorithm

PART – B (5 x 3= 15 Marks)

6. Write a recursive algorithm to compute nth Fibonacci number. CO1- R

7. State the master's theorem. Solve T(n)=4T(n/2)+n, T(1)=1 using master's theorem. CO2- R

8. What is meant by minimum spanning tree? Mention any two algorithms to find the minimum spanning tree. CO3- R

9. What is meant by Hamiltonian Circuit problem? CO4- R

10. What are NP Complete Problems? Give any three problems that are NP hard. CO5- R

PART – C (5 x 16= 80 Marks)

11. (a) Explain the steps involved in algorithmic problem solving CO1- App (16)

Or

(b) Write the recursive and non-recursive versions of the factorial function. CO1- App (16)

12. (a) Consider a set of elements {12,34,56,73,24,11,34,56,78,91,34,91,45}. Sketch the quicksort algorithm and use it to sort this set. Obtain a derivation for the time complexity of quicksort, both the worst case and average case behaviour. How does it compare with mergesort? CO2- App (16)

Or

(b) Derive the worst case analysis of merge sort using suitable illustrations. 8, 3, 2, 9, 7, 1, 5, 4 CO2- Ana (16)

13. (a) Write and explain Warshall's algorithm. Apply Warshall's algorithm to find the transitive closure of the digraph defined by the following graph CO3 Ana (16)

Or

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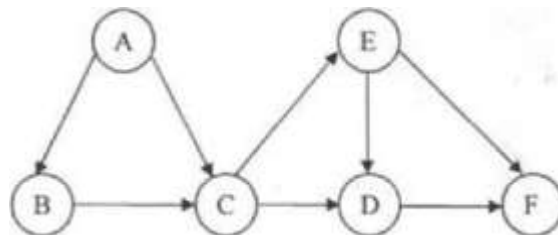
(b) (i) Explain the computing a binomial coefficient is most efficient? CO3- Ana (8)

(ii) Construct a Huffman code for the following data. CO3- Ana (8)

Character	L	M	C	G	H	F	K	J
Frequency	119	96	247	283	72	77	92	19

Encode the string : CFK

Decode the Huffman code: 1011000011

14. (a) How to find shortest tour of a graph using Traveling Salesman CO4- App (16)
problem? Explain approximation algorithm for the Traveling
Salesman Problem

Or

(b) (i) Explain 8 queens problem using backtracking along with its CO4- U (8)
state space tree.

(ii) Develop Branch and Bound for travelling salesman problem. CO4- App (8)

15. (a) Give short notes on decision problems, undecidable problem, and CO5- U (16)
NP-Complete problem.

Or

(b) Describe about parallel algorithms and list ranking algorithm. CO5- U (16)

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