CBCS Scheme

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Fourth Semester B.E. Degree Examination, June/July 2017
Design and Analysis of Algorithms

Time: 3 hrs.

Max. Marks: 80

Note: Answer FIVE full questions, choosing one full question from each module.

Module-1

1 a. Define algorithm. Explain asymptotic notations, Big O, big Omega, big theta notations. (08 Marks)

   b. Explain general plan of mathematical analysis of nonrecursive algorithms with example. (08 Marks)

OR

2 a. Define time and space complexity. Explain important problem types. (08 Marks)

   b. Illustrate mathematical analysis of recursive algorithm for towers of hanoii. (08 Marks)

Module-2

3 a. Explain concept of divide and conquer. Write merge sort algorithm. (08 Marks)

   b. Write a recursive algorithm for binary search and also bring out its efficiency. (08 Marks)

OR

4 a. Illustrate the tracing of quick sort algorithm for the following set of numbers:
      25, 10, 72, 18, 40, 11, 64, 58, 32, 9 (08 Marks)

   b. List out the advantages and disadvantages of divide and conquer method and illustrate the topological sorting for the following graph.
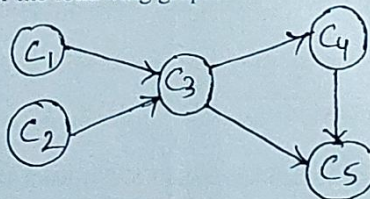

Fig.Q4(b)   (08 Marks)

Module-3

5 a. Explain Greedy criterion. Write a Prim's algorithm to find minimum cost spanning tree. (08 Marks)

   b. Sort the given list of numbers using heap sort: 2, 9, 7, 6, 5, 8. (08 Marks)

OR

6 a. Write an algorithm to find single source shortest path. (08 Marks)

   b. Construct a Huffman tree and resulting code word for the following:

Character	A	B	C	D	-
Probability	0.35	0.1	0.2	0.2	0.15

   Encode the words DAD and ADD. (08 Marks)

Module-4

7   a.   Explain the concept of dynamic programming, with example.   (08 Marks)
    b.   Trace the following graph using Warshall's algorithm.

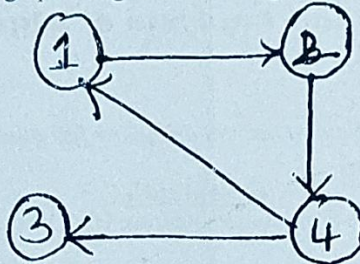Fig.Q7(b)   (08 Marks)

OR

8   a.   Explain Multistage graphs with example. Write multistage graph algorithm to forward
         approach.   (08 Marks)
    b.   Solve the following instance of Knapsack problem using dynamic programming. Knapsack
         capacity is 5.

Item	Weight	Value
1	2	$12
2	1	$10
3	3	$20
4	2	$15

(08 Marks)

Module-5

9   a.   Explain backtracking concept. Illustrate N queens problem using backtracking to solve
         4-Queens problem.   (08 Marks)
    b.   Solve subset sum problem for the following example, s = {3, 5, 6, 7} and d = 15. Construct a
         state space tree.   (08 Marks)

OR

10 a.   Explain the concept of branch and bound and solve assignment problem for the following
         and obtain optimal solution.

		Job1	Job2	Job3	Job4
	a	9	2	7	8
Person	b	6	4	3	7
	c	5	8	1	8
	d	7	6	9	4

(08 Marks)

    b.   Explain LC Branch and Bound and FIFO branch and bound.   (08 Marks)

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