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B.C.A. DEGREE (C.B.C.S.S.) EXAMINATION, OCTOBER 2012

Third Semester

Core Course—DESIGN AND ANALYSIS OF ALGORITHMS

Time : Three Hours   Maximum Weight : 25

Part A (Objective Type)

Answer all questions.
Each bunch of four questions carries a weight of 1.

I. 1 Two main measures for the efficiency of an algorithm are :

   (a) Processor and Memory.   (b) Complexity and Capacity.

   (c) Time and Space.   (d) Data and Space.

2 . The algorithm reporting 0(1) time complexity indicate :

   (a) Linear time complexity.   (b) Quadratic time complexity.

   (c) Cubic time complexity.   (d) Constant running time.

3 Which of the following case does not exist in complexity theory ?

   (a) Best case.   (b) Worst case.

   (c) Null case.   (d) Average case.

4 The worst case time complexity of quick sort is :

   (a) $O(n)$.   (b) $O(n^2)$.

   (c) $O(n.\log n)$.   (d) $O(n^3)$.

II. 5 To arrange the books of library the best method is :

   (a) Bubble sort.   (b) Quick sort.

   (c) Merge sort.   (d) Heap sort.

6 Merge sort uses :

   (a) Back tracking approach.   (b) Divide and conquer strategy.

   (c) Heuristic approach.   (d) Greedy approach.

7 Quick sort uses :

   (a) Dynamic programming.   (b) Divide and conquer strategy.

   (c) Back tracking.   (d) Greedy method.

8 Which of the following algorithm has $n \log (n)$ time complexity ?

   (a) Heap sort.   (b) Quick sort.

   (c) Insertion sort.   (d) Selection sort.

Turn over

III. 9 Which of the following method is not a sequential representation ?

    (a) Adjacency List Representation.

    (b) Adjacency matrix representation.

    (c) Incidence Matrix representation.

    (d) Path Matrix representation.

10 Choose the technique which is suitable for list of data elements represented using non-linear structures ?

    (a) Interpolation search.   (b) Depth-first search.

    (c) Fibonacci search.   (d) Binary search.

11 The worst case the number of comparisons needed to search for a key in a binary search is :

    (a) $O(\log_2 \log_2 n)$.   (b) $O(\log_2 n)$.

    (c) $O(n)$.   (d) $O(1)$.

12 The depth-first order is same as :

    (a) Breadth-first order.   (b) Preorder.

    (c) Linear order.   (d) Post order.

IV. 13 The maximum number of nodes of level j of a binary tree is :

    (a) $2j$.   (b) 2^{j-1}.

    (c) 2^{j+1}.   (d) 2^{j-2}.

14 Nodes that have zero degree are called :

    (a) Leaf nodes.   (b) Non-terminal nodes.

    (c) Parent node.   (d) None of the above.

15 Which algorithm is used to find out single shortest paths ?

    (a) Prims.   (b) Dijkstras.

    (c) Kruskals.   (d) Backtracking.

16 0/1 knapsack problem can be solved using :

    (a) Dynamic programming.   (b) Divide and conquer strategy.

    (c) Linear programming.   (d) Greedy method.

                                             $(4 \times 1 = 4)$

Part B (Short Answer)

Answer any five questions.
Each question carries a weight of 1.

17 Define algorithm.

18 Define O notations of time complexity.

19 What is meant by aprori analysis ?

20 What do you mean by internal searching ?

21 What is DFS ?

22 What is Hamilton circuit ?

23 Define backtracking.

24 What is dynamic programming ?

$(5 \times 1 = 5)$

Part C (Short Answer)

Answer any four questions.
Each question carries a weight of 2.

25 What are the properties of an algorithm ?

26 Explain Strassen's matrix multiplication.

27 Let L = {71, 17, 86, 100, 54, 27} be a unordered list of elements. Sort the above elements using selection method.

28 Discuss an application of minimum cost application tree.

29 Write the Dijkstra's algorithm for the single source shortest path problem.

30 Explain sum of subsets problem.

$(4 \times 2 = 8)$

Part D (Short Answer)

Answer any two questions.
Each question carries a weight of 4.

31 Explain quick sort with suitable example.

32 Explain greedy method using knapsack problem.

33 Explain eight queen problems.

$(2 \times 4 = 8)$