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Total No. of Pages : 02

Total No. of Questions : 18

B.Tech.(CSE) (2011 Onwards) (Sem.–5)

DESIGN & ANALYSIS OF ALGORITHMS

Subject Code : BTCS-503

M.Code : 70536

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Answer the following questions :

1. What is an algorithm?
2. If f(n) = n! and g(n) = 2n, indicate whether f = 0(g), or f = Ω(g), or both (f = θ(g)).
3. What do you mean by dynamic programming?
4. State the time complexity of Bubble sort.
5. Explain the applications of depth first search algorithm.
6. Describe asymptotic notation.
7. What is order statistics?
8. What do you mean by randomization?
9. What is convex hulls?
10. Explain the time complexity of binary search.

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SECTION-B

11. Take the following list of functions and arrange them in ascending order of growth rate. That is, if function g(n) immediately follows function f(n) in your list, then it should be the case that f(n) is O(g(n)).

    $f1(n) = n^{2.5}$, $f2(n) = \sqrt{2n}$, $f3(n) = n + 10$, $f4(n) = 10^n$, $f5(n) = 100^n$, and $f6(n) = n^2 \log n$

12. Sort the list 415, 213, 700, 515, 712, 715 using Merge sort algorithm. Also explain the time complexity of merge sort algorithm.

13. Explain breadth first search algorithm with an example.

14. Write a short note on approximation algorithms.

15. Explain the classes of P and NP.

SECTION-C

16. Explain Strassen's algorithm for matrix multiplication with the help of an example.

17. Write a short note for the following :

    a. Divide and conquer technique

    b. Greedy algorithm

18. a. Why do we perform topological sorts only on DAGs? Explain.

    b. Using Dijkstra's algorithm find the shortest path from A to D for the following graph.

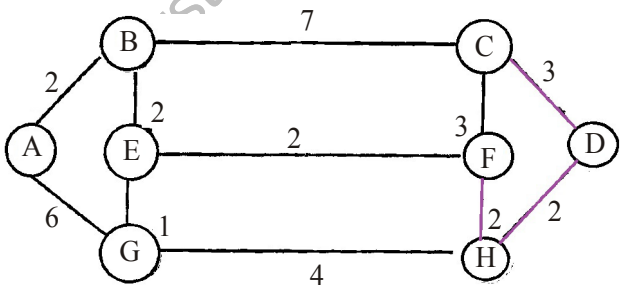


Fig.1

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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