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Question Paper Code: 54023

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Fourth Semester

Computer Science and Engineering

15UCS403 - DESIGN AND ANALYSIS OF ALGORITHMS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

- The efficiency that applies to a sequence of operations performed on the same data structure is
 - Best case Efficiency
 - Worst case efficiency
 - Average case Efficiency
 - Amortized Efficiency
- The time complexity of Matrix multiplication algorithm is
 - $O(n)$
 - $O(n^2)$
 - $O(n^3)$
 - $O(\log n)$
- The Sorting method which is used for external sort is
 - Bubble sort
 - Quick sort
 - Merge sort
 - Radix sort
- Any linear programming problem with a nonempty bounded feasible region has _____ solution.
 - Feasible
 - Optimal
 - Extreme
 - None of these
- The lower bound of multiplication of n -digit integers is
 - $\Omega(n \log n)$
 - $\Theta(n^2)$
 - $\Omega(n)$
 - $O(n)$

PART - B (5 x 3 = 15 Marks)

- Define algorithm. Describe the notion of algorithm.

7. Write an algorithm to find the number of binary digits in the binary representation of a positive decimal integer.
8. What is augmentation and augmentation path?
9. Write the difference between greedy method and dynamic programming.
10. What are P and NP problems?

PART - C (5 x 16 = 80 Marks)

11. (a) Explain the fundamental steps involved in algorithmic problem solving with neat sketch. (16)

Or

- (b) Explain divide and conquer strategy and illustrate quick sort with suitable example. (16)

12. (a) Illustrate merge sort algorithm with suitable example. Deduce its time efficiency. (16)

Or

- (b) What is decrease and conquer strategy? Explain it with insertion sort as an example. (16)

13. (a) Write the Floyd- Warshall's algorithm to solve the all-pairs shortest-path problem on a directed graph. Discuss the time complexity of the algorithm. (16)

Or

- (b) Explain the simplex method in detail. (16)

14. (a) Discuss backtracking approach. Apply backtracking to solve the following subset sum problem $s = \{3, 5, 6, 7\}$ and $d=15$. (16)

Or

- (b) Explain about the assignment problem and travelling salesman problem in detail. (16)

15. (a) State branch and bound. Illustrate the branch-and-bound approach by applying it to the problem of assigning n people to n jobs. (16)

Or

- (b) Explain Knapsack problem in detail with an example problem. (16)