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**Question Paper Code: 50243**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 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)

- Two main measures for the efficiency of an algorithm are
  - Processor and memory
  - Complexity and capacity
  - Time and space
  - Data and space
- 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
- The total running time of optimal binary search tree of  $n$  nodes
  - $O(n^2)$
  - $O(n)$
  - $O(n^3)$
  - $O(n \log n)$
- If every square of the board is visited, then the total number of knight moves of  $n$ -queen problem is
  - $n^3 - 1$
  - $n - 1$
  - $n^2 - 1$
  - $\log n - 1$

PART - B (5 x 3 = 15 Marks)

- Define the notion of an algorithm.
- Write an algorithm to find the number of binary digits in the binary representation of a positive decimal integer.

8. Explain the stable marriage problem.
9. Write the difference between greedy method and dynamic programming.
10. Compare Backtracking, Branch and Bound techniques.

PART - C (5 x 16 = 80 Marks)

11. (a) Explain the various asymptotic notations and basic efficiency classes. (16)

Or

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

12. (a) Explain the mathematical analysis of recursive algorithms in detail. (16)

Or

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

13. (a) Explain Warshall's and Floyd's algorithm in detail. (16)

Or

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

14. (a) (i) Write an algorithm for N-QUEEN's problem and explain 8-QUEEN'S problem in detail (8)

- (ii) What is Hamiltonian Problem? Explain with an example using backtracking. (8)

Or

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

15. (a) Explain about P, NP and NP-Complete problems in detail. (16)

Or

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

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