

PREVIOUS END EXAM QUESTIONS

R09

Code No: 09A40505

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech II Year II Semester Examinations, June-2014

DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE, IT)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Explain the asymptotic notations used in algorithm analysis.
- b) What is big "oh" notation? Show that if $f(n) = a_m n^m + \dots + a_1 n + a_0$ then $f(n) = O(n^m)$.
- 2.a) What is weighting rule for Union(i, j)? How it improves the performance of union operation? Explain with example.
- b) What is biconnected graph? How to determine biconnected components of graph?
- 3.a) Apply divide and conquer strategy to the following input values for searching 112 and -14 by showing the values of low, mid, high for each search.
-15, -6, 0, 7, 9, 23, 54, 82, 101, 112, 125, 131, 142, 151
- b) Why Strassen's matrix multiplication method is efficient? Explain with suitable example.
- 4.a) What is job sequencing with deadlines problem? Let $n = 5$, $(p_1, p_2, \dots, p_5) = (10, 3, 33, 11, 40)$ and $(d_1, d_2, \dots, d_5) = (3, 1, 1, 2, 2)$. Find the optimal solution using greedy algorithm.
- b) Write and explain the control abstraction for Divide and conquer.
- 5.a) How reliability design problem can be solved with dynamic programming? Give example.
- b) Discuss about all pairs shortest path problem with suitable example.
- 6.a) What is Hamiltonian cycle? Discuss a backtracking algorithm that finds all the Hamiltonian cycles in a graph.
- b) Write a recursive backtracking algorithm for sum of subsets problem.
- 7.a) Illustrate LCBB solution to solve the knapsack problem.
- b) What do you mean by bounding? Explain how these bound are useful in branch and bound methods?
- 8.a) Explain the classes of NP-Hard and NP-Complete.
- b) Discuss about deterministic and non-deterministic algorithms.

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R09

Code No: 54016

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B.Tech II Year II Semester Examinations, December-2014/January-2015
DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSE, IT)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) What is amortized analysis? Explain with example.
- b) What is meant by asymptotic notation? Why it is used? Explain.
- 2.a) Explain the representations of disjoint set union with example.
- b) What is biconnected graph? How to determine biconnected components of graph?
- 3.a) Apply merge sort and show the file after each splitting and then merging for the following input: 30, 12, 75, 35, 85, 70, 35, 59.
- b) What is binary search? How it can be implemented by Divide and conquer strategy? Explain with example.
- 4.a) What is job sequencing with deadlines problem? Let $n = 5$, $(p_1, p_2, \dots, p_5) = (1, 3, 6, 9, 5)$ and $(d_1, d_2, \dots, d_5) = (3, 1, 1, 2, 2)$. Find the optimal solution using greedy algorithm.
- b) Can we solve 0/1 knapsack problem with greedy method? Discuss with example.
- 5.a) Discuss about all pairs shortest path problem with suitable example.
- b) Find the minimum no of operations required for the following chain matrix multiplication using dynamic programming.
 $A(20,30) * B(30,10) * C(10,5) * D(5,15)$.
- 6.a) Write a recursive backtracking algorithm for sum of subsets problem.
- b) Draw and explain the portion of the tree for 4-queens problem that is generated during backtracking.
- 7.a) What do you mean by bounding? Explain how these bound are useful in branch and bound methods?
- b) Explain the principles of:
 - i) FIFO branch and Bound
 - ii) LC Branch and Bound.
- 8.a) Discuss about cook's theorem.
- b) Explain the classes of NP-Hard and NP-Complete.

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