

C 20545

(Pages : 2)

Name

Reg. No

SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION
JUNE 2006

CS 2K 601—DESIGN AND ANALYSIS OF ALGORITHMS

Time : Three Hours

Maximum : 100 Marks

1. (a) Briefly describe the different hashing functions.
(b) Explain master theorem and solve $T(n) = 2T\left(\frac{n}{2}\right) + n^2$.
(c) Describe the Floyd - Warshall algorithm.
(d) Distinguish between class P and NP problems.
(e) What is eight queen problem ?
(f) Describe Huffman coding.
(g) Show that the vertex cover problem is NP - complete.
(h) What is universal hashing ?
- (8 × 5 = 40 marks)
- II. (a) (i) Prove that the running time of an algorithm is $\theta(g(n))$ if and only if its worst case running time is $O(g(n))$ and its best case running time is $\Omega(g(n))$.
(ii) Explain the RAM model.
- (10 marks)
(5 marks)
- Or
- (b) (i) Describe the potential method of amortized analysis.
(ii) Write an algorithm for quicksort and calculate its average and worst case time complexity.
- (7 marks)
(8 marks)
- III. (a) Describe the dynamic programming algorithm design technique with the help of suitable examples.
- (15 marks)
- Or
- (b) Give any *one* greedy algorithm for finding the minimum cost spanning tree. Analyse it.
- (15 marks)
- IV. (a) (i) Distinguish between NP - hard and NP - complete problems.
(ii) Give a polynomial time algorithm to compute the n^{th} Fibonacci number. Analyse the asymptotic order of your algorithm.
- (5 marks)
(10 marks)
- Or
- (b) Suggest an approximation algorithm for traveling sales person problems using minimum spanning tree algorithm. Assume that the cost function satisfies the triangle inequality.
- (15 marks)
- Turn over

- V. (a) (i) What is the success rate in Monte-Carlo experimentation ? (6 marks)
- (ii) Write down Pollard's rho heuristic. Mention the advantages. (9 marks)
- (b) Explain Miller-Rabin primality test. How does it overcome the problems of pseudo primality testing. (10 marks)
- (ii) Comment about the error rate of Miller-Rabin primality test. (5 marks)