Reg. No. : | | | | | | | | | | |

Question Paper Code: 34204

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Fourth Semester

Computer Science and Engineering

01UCS404 - DESIGN AND ANALYSIS OF ALGORITHMS

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. What is algorithm design technique?
2. List the sequence of steps to perform empirical analysis of algorithm's time efficiency.
3. Name four applications of Brute-force approach.
4. What is knapsack problem?
5. Define dynamic programming.
6. State the uses of memory functions to solve knapsack problem.
7. What is an objective row?
8. What is a decision tree?
9. When a node in state-space tree is said to be a non promising node?
10. What are NP complete problems? Give an example.

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Discuss the various steps involved in algorithmic problem solving. (10)

(ii) Mention the different types of problems and give examples to each. (6)

Or

(b) Solve the following recurrence relations (16)

a) $x(n)=x(n-1)+5$ for $n > 1$ $x(1)=0$

b) $x(n)=3x(n-1)$ for $n > 1$ $x(1)=4$

c) $x(n)=x(n-1)+n$ for $n > 0$ $x(0)=0$

d) $x(n)=x(n/2)+n$ for $n > 1$ $x(1)=1$ (solve for $n=2^k$)

e) $x(n)=x(n/3)+1$ for $n >1$ $x(1)=1$ (solve for $n=3^k$)

12. (a) Describe sequential search and Brute force string matching using Brute force method. (16)

Or

(b) Discriminate the following solutions based on the time complexity with necessary justification

(i) Strassen's matrix multiplication (8)

(ii) Multiplication of largest integer (8)

13. (a) Apply the bottom up dynamic programming algorithm to the following instance of Knapsack Problem

Item	Weight	Value
1	7	$42
2	3	$12
3	4	$40
4	5	$25

Capacity W=10. (16)

Or

(b) Write the Floyd's algorithm for solving all pair shortest path. (16)

14. (a) Summarize the steps to be performed in a simplex method with an example. (16)

Or

(b) Explain briefly about the maximum-flow problem with an example. (16)

15. (a) (i) Compare branch-and-bound and backtracking. (6)

(ii) Draw the state space tree for the problem with the numbers 7, 5, 3, 13, 20, 8 and M = 18. Apply backtracking to solve the given subset sum problem. (10)

Or

(b) Draw the State-space tree of solving the four queens problem by backtracking. (16)

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