GOVERNMENT ENGINEERING COLLEGE - MODASA

Chapter wise Question bank

Subject Name	Analysis and Design of Algorithm
Semester	5th
Department	Information Technology / Computer Engineering
Term	ODD 2015

Chapter 1 : Basics of Algorithms and Mathematics

1. What is an algorithm? Explain characteristics of any algorithm. (Winter 2013 , Winter 2012)

Chapter 2 : Analysis of Algorithm

2. Explain why analysis of algorithms is important? Explain: Worst Case, Best Case & Average Case Complexity.

3. Why do we use asymptotic notations in the study of algorithms? Briefly describe the commonly used asymptotic notations. (summer 2014, summer 2013)

4. Explain why analysis of algorithms is important? Arrange the following growth rate in increasing order: n^3 , 1, n^2, nlog(n), n^2log(n), log(n), $n^{0.5}$ (Winter 2013)

5. What is Recursion? Give Recursive algorithm for Tower of Hanoi Problem and give analysis of it. (Winter 2013)

6. Explain Bubble sort Algorithm and give its best case, worst case and average case complexity.

7. Sort the letters of word “DESIGN” in alphabetical order using bubble sort. (summer 2014)

8. Explain Selection Sort Algorithm and give its best case, worst case and average case complexity. (summer 2014)

9. Explain Insertion Sort Algorithm and give its best case, worst case and average case complexity.

10. Sort the letters of word “EXAMPLE” in alphabetical order using insertion sort. (Summer 2013)

11. Explain the heap sort in detail. Give its complexity. (summer 2014)

12. Give the properties of Heap Tree. Sort the following data with Heap Sort Method: 20, 50, 30, 75, 90, 60, 25, 10, 40. (Winter 2013)

- Give the properties of Heap Tree. Sort the following data with Heap Sort Method: 65, 75, 5, 55, 25, 30, 90, 45, 80. (Winter 2012)

13. List out various linear sort methods. Explain any one of them giving algorithm and example.

Chapter 3 : Divide and Conquer Algorithm

14. Show how divide and conquer technique is used to compute product of two n digit no with example. (summer 2014)

15. Explain the use of Divide and Conquer Technique for Binary Search Method. What is the time complexity of Binary Search Method? (Winter 2013)

16. What is Divide and Conquer Technique? Give the use of it for Binary Searching Method. Also give its Time Complexity. (Winter 2012)

17. Explain algorithm of Merge Sort Method with example. Give its Time Complexity.

18. Explain algorithm of Quick Sort Method with example. Give its Time Complexity. (Winter 2012, Winter 2013)

19. Write the quick sort algorithm. Trace the same on data set – 4,3,1,9,8,2,4,7 (Summer 2013)

20. Sort the following list using quick sort algorithm: <50, 40, 20, 60, 80, 100, 45, 70, 105, 30, 90, 75> Also discuss worst and best case of quick sort algorithm. (summer 2014)

Chapter 4 : Greedy Algorithm

22. Explain in brief characteristics of greedy algorithms. Compare Greedy Method with Dynamic Programming Method. (Summer 2014 , Winter 2013, Summer 2013)

23. Explain Prim's Algorithm to find Minimum Spanning Tree with example. compute its time complexity. (summer 2014, Winter 2013, Summer 2013)

24. Define Minimal Spanning Tree(MST). Explain Kruskal's algorithm with example for construction of MST. (summer 2014 , Winter 2013, Summer 2013, Winter 2012)

Chapter 5 : Dynamic Programming

25. Define: Optimal Solution, Feasible solution, Principle of Optimality. (Winter 2012)

26. Given coins of denominations 1, 3 and 4 with amount to be pay is 7. Find optimal no. of coins and sequence of coins used to pay given amount using dynamic method. (Summer 2014)

27. Solve Making Change problem using Dynamic Programming. (denominations: d1=1,d2=4,d3=6). Give your answer for making change of Rs. 8. (Winter 2013, Winter 2012)

28. Given coins of denominations 2, 4 and 5 with amount to be pay is 7. Find optimal no. of coins and sequence of coins used to pay given amount using dynamic method.(Summer 2013)

29. Solve following knapsack problem using dynamic programming algorithm with given capacity W=5, Weight and Value are as follows : (2,12),(1,10),(3,20),(2,15) (Summer 2014, Summer 2013)

30. Solve the following 0/1 Knapsack Problem using Dynamic Programming Method. Write the equation for solving the problem.

n = 5, W = 11

Object	--> 1	2	3	4	5
Weight (w)	--> 1	2	5	6	7
Value (v)	--> 1	6	18	22	28

(Winter 2013)

30. Solve the following Knapsack Problem using Dynamic Programming Method. Write the equation for solving above problem.

n = 5, W = 100

Object	--> 1	2	3	4	5
Weight (w)	--> 10	20	30	40	50
Value (v)	--> 20	30	66	40	60

(Winter 2012)

31. Write the equation for finding out shortest path using Floyd's algorithm. Use Floyd's method to find shortest path for below mentions all pairs

0	∞	3	∞
2	0	∞	∞
∞	7	0	1
6	∞	∞	0

(Summer 2013)

32. Given the four matrix find out optimal sequence for multiplication D=<15,5,10,20,25> (Summer 2014)

33. Given the four matrix find out optimal sequence for multiplication D=<5,4,6,2,7> (Summer 2013)

34. Explain Chained Matrix Multiplication with example. (Winter 2012)

35. Given two sequences of characters, P=<ABCDABE>, Q=<CABE> Obtain the longest common subsequence. (Summer 2014)

36. Find Longest Common Subsequence using Dynamic Programming Technique with illustration X={A,B,C,B,D,A,B} Y={B,D,C,A,B,A} (Winter 2013, Winter 2012)

37. Given two sequences of characters, P=<MLNOM> Q=<MNOM> Obtain the longest common subsequence. (Summer 2013)

Chapter 6 : Exploring Graphs

38. Explain: Articulation Point, Graph, Tree. (Winter 2013)

39. Explain in brief Breadth First Search and Depth First Search Traversal techniques of a Graph. (Winter 2012)

40. Write pseudo code for the basic depth first search algorithm. (Summer 2013)

41. Differentiate BFS and DFS. (Summer 2013)

Chapter 7: Backtracking and Branch and Bound

42. Explain Backtracking Method. What is N-Queens Problem? Give solution of 4-Queens Problem using Backtracking Method. (Summer 2014, Winter 2013 ,Winter 2012, Summer 2013)

43. Explain use of Branch & Bound Technique for solving Assignment Problem. (Winter 2013)

Chapter 8: String Matching

44. What is the basic idea behind Rabin – Karp algorithm? Explain Rabin-Karp Algorithm for string matching with example and give it complexity. (summer 2014, Winter 2013, Summer 2013)

45. What is Finite Automata? Explain use of finite automata for string matching with suitable example. (summer 2014, Winter 2013, Summer 2013, Winter 2012)

46. Using Knuth-Morris-Pratt Algorithm match pattern P=”ababada” in Text T=”badbabababadaab”

Chapter 9: Introduction to NP-Completeness

47. Define P, NP, NP complete and NP-Hard problems. (Winter 2013)

48. Write a brief note on NP-completeness and the classes-P, NP and NPC. (summer 2014)

49. Explain P and NP Problems. (Summer 2013)

50. Explain in Breif: P Problem, NP Problem, Travelling Salesman Problem, Min Max Principle. (Winter 2012)