

# KADI SARVA VISHWAVIDYALAYA

B.E. SEMESTER-IV EXAMINATION (October-2015)

Subject Code : CE/IT 404

SUBJECT NAME: Design Analysis of Algorithm

DATE: 28/10/2015

TIME: 10:30 a.m. to 1:30 p.m.

TOTAL MARKS: 70

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## Instructions:

1. Answer each section in separate Answer Sheet.
2. Use of scientific Calculator is permitted.
3. All questions are compulsory.
4. Indicate clearly, the options you attempted along with its respective question number.
5. Use the last page of main supplementary for rough work.

## SECTION-1

**Q.1** (A) Write an algorithm of Insertion Sort. Give its complexity. [5]

(B) What is algorithm? Describe characteristics of algorithm [5]

(c) Explain amortized analysis [5]

**OR**

(c) Define big oh( $O$ ), Big omega( $\Omega$ ) and big theta( $\Theta$ ) notations [5]

**Q.2** (A) What is greedy method? Explain general algorithm for greedy method and also write use of greedy method. [5]

(B) Write short note on multiplication of large integer numbers using divide and conquer technique. [5]

**OR**

**Q.2** (A) Write an algorithm for Fibonacci numbers generation and compute its complexity [5]

(B) Compare greedy with dynamic programming. [5]

**Q.3** (A) Find the solution of the knapsack instance  $n=7$ ,  $M=15$  and profit vector  $(10,5,15,7,6,18,3)$  and weight vector  $(2,3,5,7,1,4,1)$ . [5]

(B) Given the four matrix find out optimal sequence for multiplication [5]

$$D = \begin{pmatrix} 15 & 5 & 10 & 20 & 25 \end{pmatrix}.$$

**OR**

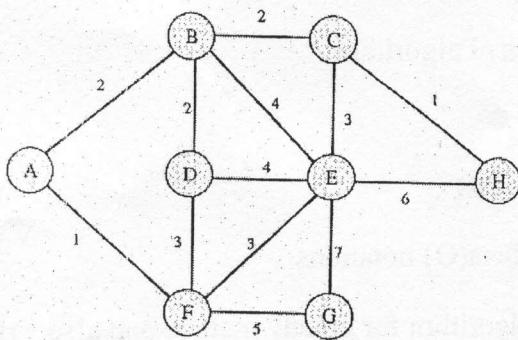
- Q.3 (A) What is minimum spanning tree problem explain with example and discuss its complexity. [5]  
(B) Write the quick sort algorithm. Trace the same on data set - 4,3,1,9,8,2,4,7 [5]

**SECTION-2**

- Q.4 (A) Describe binary search in detail. Also provide the analysis with example [5]  
(B) Describe steps of developing an algorithm. [5]  
(c) Explain prim's algortihm and discuss its complexity. [5]

**OR**

- (c) Find MST using kruskal's algorithm for following graph. [5]



- Q.5 (A) Write and explain the Breadth First Search algorithm. [5]  
(B) Explain use of Divide & Conquer techniques for merge sort. Find best, average and worst case complexity for merge sort. [5]

**OR**

- Q.5 (A) Find Longest common subsequence for X= BACDB and Y= BDCB [5]  
(B) Trace merge sort for following data [5]

17, 12, 34, 7, 11, 18, 5, 16, 10, 9

Q.6 (A) Describe shortest path algorithm with example. [5]

(B) Solve the following recurrence equation with master method [5]

1.  $T(n) = 2T(n/2) + n$

2.  $T(n) = 3T(n/4) + nlgn$

OR

Q.6 (A) Explain naive string matching algorithm [5]

(B) Explain P, NP – complete and NP-Hard Problem [5]

-----ALL THE BEST-----

# KADI SARVA VISHWAVIDYALAYA

B.E. SEMESTER 4<sup>th</sup> CE /IT EXAMINATION (May 2014)

SUBJECT: DESIGN ANALYSIS OF ALGORITHM (404)

DATE: 14.5.14

TIME: 10:30 to 1:30

TOTAL MARKS: 70

Instructions:

1. Answer each section in separate Answer sheet.
2. Use of Scientific Calculator is permitted.
3. All questions are compulsory.
4. Indicate clearly, the options you attempted along with its respective question number.
5. Use the last page of main supplementary for rough work.

## Section-1

Q: 1 (A) What is an algorithm? Explain: Worst Case, Best Case & Average Case

Complexity. (05)

(B) Define: Optimal Solution, Feasible solution, Graph, Tree and Time Complexity. (05)

(C) Explain Characteristics of Greedy Algorithm. (05)

Q: 2 (A) Explain Selection Sort algorithm with example also give its complexity. (05)

(B) Sort the letters of word “ELECTION” in alphabetical order using insertion sort. (05)

OR

Q: 2 (A) Explain Quick Sort Method with example. Give its Time Complexity. (05)

(B) What is Divide and Conquer Technique? Give the use of it for Binary searching method. (05)

Q: 3 (A) Explain Krushkal's Algorithm to find Minimum Spanning Tree with example. (05)

(B) Solve the following Knapsack Problem using Dynamic Programming Method. (05)  
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

OR

Q: 3 (A) Explain Prim's Algorithm to find Minimum Spanning Tree with example. (05)

(B) Solve Making Change problem using Dynamic Programming. (05)  
(Denominations:  $d_1=1$ ,  $d_2=4$ ,  $d_3=6$ ). Give your answer for making change of Rs. 8.

## Section-2

Q: 4 (A) Explain Backtracking Method. What is N-Queens Problem? Give solution of 4-Queens problem using Backtracking Method. (05)

(B) Explain Dijkstra's algorithm to find minimum distance of all nodes from a given node. (Greedy algorithm). (05)

(C) Explain BFS, DFS with example. (05)

Q: 5 (A) Explain Rabin- Karp method with example for string matching. (05)

(B) Find Longest Common Subsequence using Dynamic Programming Technique with illustration  $X=\{A,B,C,B,D,A,B\}$   $Y=\{B,D,C,A,B,A\}$ . (05)

## OR

Q: 5 (A) Explain string matching with finite automata. (05)

(B) Using algorithm determine an Longest Common Sequence of  $\{A,B,C,D,B,A,C,D,F\}$  and  $\{C,B,A,F\}$  (using dynamic programming). (05)

Q: 6 (A) What is Recursion? Give the implementation of Tower of Hanoi problem using Recursion. (05)

(B) Define P, NP, NP complete and NP-Hard problems. (05)

## OR

Q: 6 (A) Explain linear inequality and equations. (05)

(B) Explain Chained Matrix Multiplication with example. (05)

**ALL THE BEST**

# KADI SARVA VISHWAVIDYALAYA

B.E. (C.E./I.T.) SEMESTER-IV EXAMINATION (APRIL-MAY-2015)

SUBJECT CODE: CE/IT 404 SUBJECT NAME: Design Analysis of Algorithm

DATE: 05/05/2015

TIME: 10:30 to 1:30

TOTAL MARKS: 70

## Instructions:

1. Answer each section in separate Answer Sheet.
2. Use of scientific Calculator is permitted.
3. All questions are compulsory.
4. Indicate clearly, the options you attempted along with its respective question number.
5. Use the last page of main supplementary for rough work.

## SECTION-1

Q:1

- (A) Explain why analysis of algorithms is important? Explain: Worst Case, Best Case & Average case Complexity. [5]
- (B) Write an algorithm of Selection Sort. Give its complexity. [5]
- (C) What is an algorithm? Explain characteristics of any algorithm. [5]

OR

- (C) Give the recursive algorithm to find Fibonacci sequence. Comment on the complexity of the algorithm. [5]

Q:2

- (A) Explain all asymptotic notations used in algorithm analysis. [5]
- (B) Write the quick sort algorithm. Trace the same on data set - 4,3,1,9,8,2,4,7. [5]

OR

- (A) Explain Kruskal's Algorithm to find Minimum Spanning Tree with example. [5]
- (B) Explain the use of Divide and Conquer Technique for Binary Search Method. [5]
- What is the complexity of Binary Search Method. [5]

Q:3

- (A) Explain in brief characteristics of greedy algorithms. [5]
- (B) Given the four matrix find out optimal sequence for multiplication  
 $D = \langle 15 \ 5 \ 10 \ 20 \ 25 \rangle$ . [5]

OR

- (A) Compare Greedy Method with Dynamic Programming Method. [5]
- (B) Solve following recurrence equation [5]

$$\begin{aligned} t_n &= n && \text{if } n=0, 1 \text{ or } 2 \\ &= 5t_{n-1} - 8t_{n-2} + 4t_{n-3} && \text{otherwise} \end{aligned}$$

## SECTION-2

Q:1

- (A) Write algorithm for insertion sort and find its complexity. [5]  
(B) Explain how to apply the divide and conquer strategy for sorting the elements using Merge sort with example. [5]  
(C) Describe complexity of quick sort for best case, average case and worst case. [5]

OR

- (C) Solve the following recurrence equation with master method. [5]

$$1. T(n)= 9T(n/3) + n$$

$$2. T(n)= 3T(n/4) + nlgn$$

Q:2

- (A) Describe an assembly line scheduling problem and give dynamic programming algorithm to solve it. [5]  
(B) Find Longest Common Subsequence using Dynamic Programming Technique with illustration  $X=\{A,B,C,B,D,A,B\}$   $Y=\{B,D,C,A,B,A\}$ . [5]

OR

- (A) Define MST. Explain prim's algorithm with example for construction of MST. [5]  
(B) Solve following knapsack problem using dynamic programming algorithm with given capacity  $W=5$ , Weight and Value are as follows :  $(2,12), (1,10), (3,20), (2,15)$ . [5]

Q:3

- (A) Explain Rabin-Karp Algorithm for string matching and give it complexity [5]  
(B) Explain Dijkstra's shortest path algorithm with example. [5]

OR

- (A) Define: Acyclic Directed Graph, Articulation Point, Dense Graph, Sparse Graph, Traveling salesman problem. [5]  
(B) Explain P and NP Problems . [5]

-----ALL THE BEST-----

# KADI SARVA VISHWAVIDYALAYA

B.E. (C.E./I.T.) SEMESTER-IV EXAMINATION (APRIL-MAY-2015)

SUBJECT CODE: CE/IT 404 SUBJECT NAME: Design Analysis of Algorithm

DATE: 05/05/2015

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OR

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(B) Explain P and NP Problems . [5]

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