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Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 33226 Roll No.

B. Tech. Examination 2021-22

(Even Semester)

DESIGN & ANALYSIS OF ALGORITHMS

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION–A

1. Attempt all parts of the following : 8×1=8

(a) What is an algorithm? Define.

(b) Describe in details about asymptotic notations.

(c) Write best, average and worst case time complexity of quick sort.

(d) What is the concept of randomized algorithm?

(e) Differentiate between backtracking and branch and bound methods.

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(f) Differentiate between breath first search and depth first search.

(g) Differentiate between divide and conquer and greedy approach of algorithm.

(h) What is naive string matching algorithm.

SECTION – B

2. Attempt any two parts of the following : $2 \times 6 = 12$

(a) What is 0/1 knapsack problem? Solve the following instance using dynamic programming. Write the algorithm also. Knapsack capacity = 10, P = <1, 6, 18, 22, 28> and w = <1, 2, 5, 6, 7>.

(b) Describe in detail the Strassen's matrix multiplication algorithm based on divide and conquer strategies with suitable example.

(c) Write the string matching Rabin Karp algorithm using Rabin Karp algorithm on given data find the substring :

P = 26, T = 3141592653589793 and q = 11.

(d) Examine the time complexity of the equations :

(i) $T(n) = T\left(\sqrt{n}\right) + 0(1)$

(ii) $T(n) = 7T\left(n/2\right) + n^3$

SECTION – C

Note :– Attempt all questions. Attempt any two parts from each questions. 5×8=40

3. (a) Using Boyer Moore algorithm on the following data :

P = a b a b c a

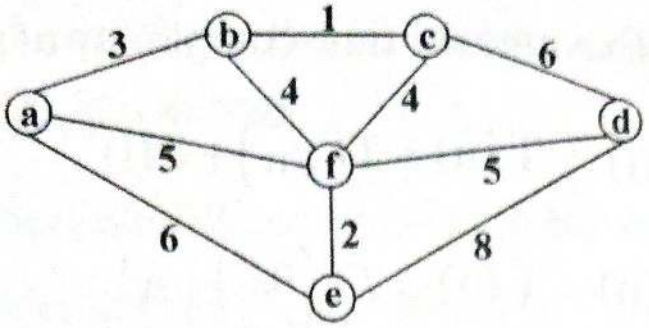
T = a b b a b b b a b a b c a a a

Find the substring also write algorithm.

(b) Explain the concept of N, NP & NP completeness.

(c) What is Travelling Salesman Problem (TSP)? Show that TSP is NP problem. Explain at least one approach used to solve the problem.

4. (a) Find out minimum spanning tree using Kruskal algorithm for giving graph

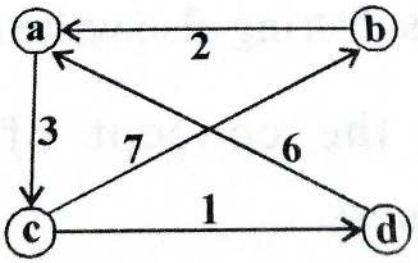


6.

(b) Write Merge Bort algorithm and compute its best and worst case time complexity. Sort L, U, C, K, N, O, W in alphabatical order using merge sort.

(c) Write short note on binomial heap.

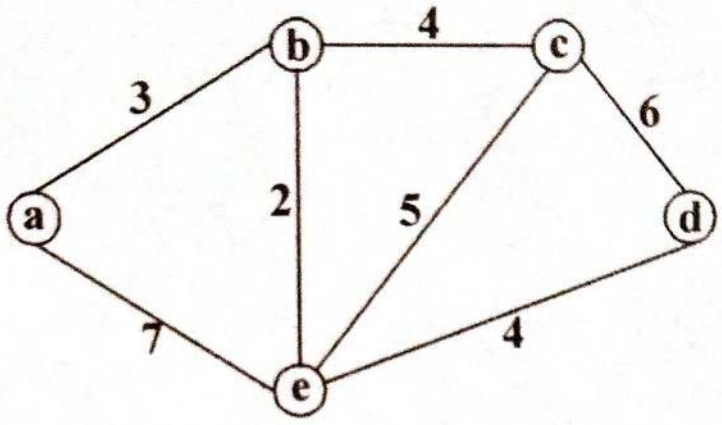
5. (a) Find all pair of shortest path using Floyd's algorithm for the given graph :



(b) Write quick sort algorithm and compute its best and worst case time compexity. Sort 7, 9, 2, 3, 15, 1, 12, 30 in ascending order using quick sort.

(c) Write short note on AVL Tree.

6. (a) Find single source shortest path using Dijkstra's algorithm from a to d :



(b) Discuss any two methods of amortized analysis in detail.

(c) Sort given array

$$A = \{27, 46, 11, 95, 67, 32, 78\}$$

using insertion sort algorithm. Also perform best case and worst case analysis of insertion sort algorithm.

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