BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)

B. Tech. Sem - IV Computer Science & Engineering : WINTER : 2023

SUBJECT : DESIGN OF ALGORITHMS

Day : Thursday

Date : 23-11-2023

Time : 02:30 PM-05:30 PM

W-25584-2023

Max. Marks : 60

N.B.

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.

Q.1 a) Explain the performance analysis factors that can be used to analyze running time of an algorithm. **(10)**

b) Write a short note on randomized and iterative algorithms with suitable examples

OR

a) Explain time and space trade off with examples.

b) Write Insertion sort algorithm and discuss its running time in all three cases (best, average and worst)

Q.2 Write Merge sort algorithm. Discuss its Best case, Average case and Worst-case running time. Take suitable example. **(10)**

OR

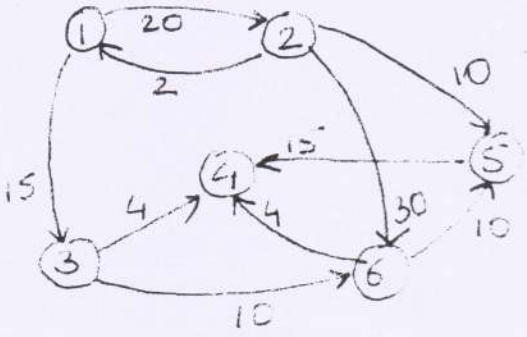
Explain working of Strassen's Matrix Multiplication. Justify how it is efficient than conventional matrix multiplication.

Q.3 Discuss algorithm of job sequencing with deadline. Obtain the solution when $n=5$, $(p_1,..p_5)=\{20, 15, 10, 5, 1\}$, $(d_1,\ldots,d_5)=\{2, 2, 1, 3, 3\}$ **(10)**

OR

Write and explain Kruskal's algorithm. Take a suitable example to apply the algorithm. Also discuss the running time of the algorithm.

Q.4 Write algorithm to find shortest path for the given graph from vertex 1 to all the remaining vertices using Dynamic Programming. **(10)**



OR

a) Obtain the solution to Knapsack problem using Dynamic Programming where $n=6$, $M=15$, $(p_1,..,p_6)=\{10, 5, 15, 7, 6, 18\}$, $(w_1,\ldots,w_6)=\{2, 3, 5, 7, 1, 4\}$

b) Write algorithm for BFS. Also discuss its running time.

P.T.O.

Q.5 Explain the working of LCBB strategy. Apply on 15 Puzzle problem. **(10)**

OR

Write a note on

a) Graph coloring using backtracking.
b) Hamiltonian Cycle using backtracking.

Q.6 Explain P, NP, NP-Hard and NP-Complete classes in detail. Show Vertex TSP is NPC. **(10)**

OR

Discuss the approximation algorithm for NP-Hard problem.

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