SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
M.Sc. Comp Sci - END SEMESTER EXAMINATIONS APRIL - 2024
SEMESTER - II
23PCSCT2004 - Design and Analysis of Algorithms

Total Duration : 2 Hrs. 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Interpret the following recurrence relation using the substitution method. T(n) =2T(n/2) + n. Here T(1) = 1.
2. Illustrate a program with example that utilizes the divide and conquer algorithm.
3. Write in detail about Hamiltonian cycles. Give example to it.
4. Assess a comprehensive explanation of how the binary search algorithm operates when searching for the element 9 within the given sorted input sequence: -15, -6, 0, 7, 9, 23, 54, 82, 101, 112, 125, 131, 142, 151.
5. Consider the travelling salesman instance defined by the following cost matrix. Solve this using Branch and Bound technique.

∞	20	30	10	11
15	∞	16	4	2
3	5	∞	2	4
19	6	18	∞	3
16	4	7	16	∞

6. Relate the utilization of the branch and bound technique in tackling the 0/1 knapsack problem.
7. Classify the recent progress in utilizing oracles and advisory arguments in algorithm design and discuss how these advancements impacted areas such as machine learning, optimization, and data analysis?
8. Illustrate All-Pair shortest Paths with a graph and explain based on dynamic programming techniques.

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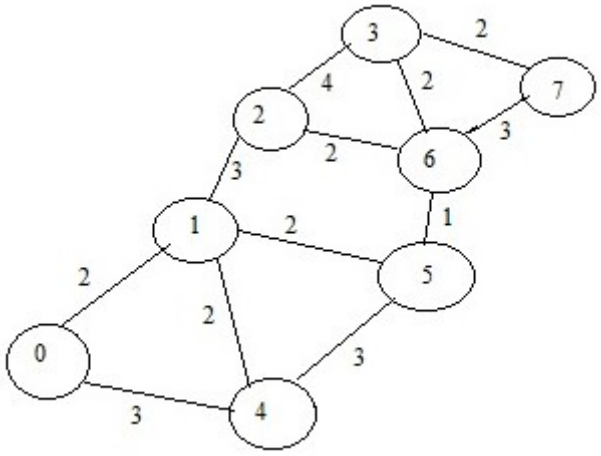
Section C

I - Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. Illustrate the Depth-First Search (DFS) and Breadth-First Search (BFS) traversal sequences for a specified graph.



10. Describe in detail job sequencing with deadlines problem.
    Let n = 4(p_1,p_2,p_3,p_4)=(100,10,15,27) and (d_1,d_2,d_3,d_4) = (2,1,2,1).
    Find the optimal solution for the given values.
11. Illustrate Merge sort algorithm and discuss its time complexity.
12. Define Time complexity. Describe different notations used to represent more complexities.

II - Compulsory question $(1 \times 10 = 10$ Marks)

13. Compute the optional solution for knapsack problem using greedy method N=3,M=20.
    (p_1,p_2,p_3)=(25,24,15) ,(w_1,w_2,w_3)=(18,15,10).

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