Reg. No.: | | | | | | | | |

G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.

PG DEGREE END SEMESTER EXAMINATIONS - NOVEMBER 2024.

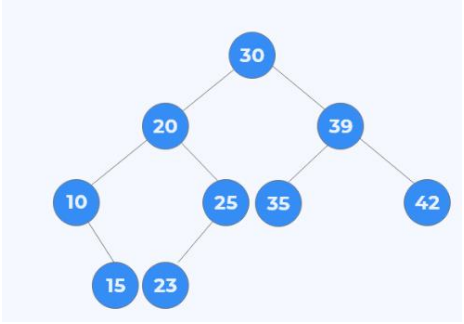
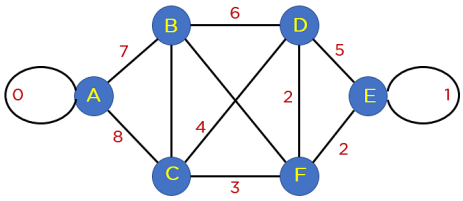
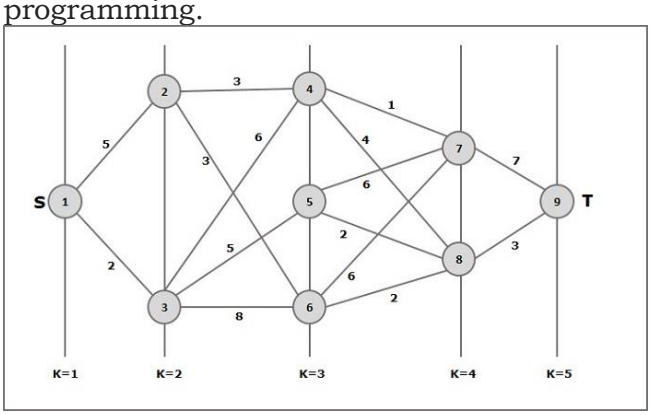
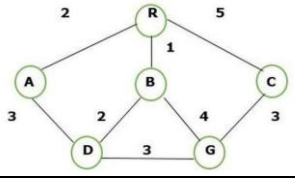
(For those admitted in June 2023 and later)

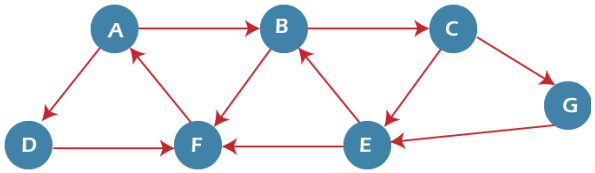
PROGRAMME AND BRANCH: M.Sc., COMPUTER SCIENCE

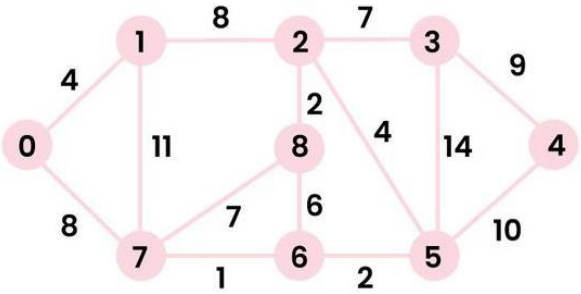
SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
I	PART - III	CORE-1	P23CS101	ANALYSIS AND DESIGN OF ALGORITHM

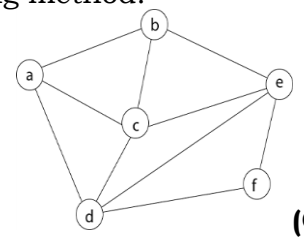
Date : 04.11.2024 / AN **Time : 3 hours** **Maximum: 75 Marks**

Course Outcome	Bloom's K-level	Q. No.	**SECTION – A (10 X 1 = 10 Marks)** **Answer ALL Questions.**
CO1	K1	1.	Which of the following case does not exist while calculating time complexity? a) Best Case b) Worst Case c) Null Case d) Average Case
CO1	K2	2.	Which of the following is false about a binary search tree? a) The left child is always lesser than its parent b) The right child is always greater than its parent c) The left and right sub-trees should also be binary search trees d) In order sequence gives decreasing order of elements
CO2	K1	3.	Select the best description to explain what a binary search algorithm is a) Put the elements in order, check each item in turn b) Elements do not need to be in order, compare to the middle value, split the list in order and repeat c) Elements do not need to be in order, check each item in turn d) Put the elements in order, compare with the middle value, split the list in order and repeat
CO2	K2	4.	Backtracking uses --------- node generation -------- bounding functions. a) Breadth first, with b) Breadth first, without c) Depth-first, with d) depth- first, without
CO3	K1	5.	Identify the approach used to find prim's algorithm for finding the minimum spanning tree. a) Divide and Conquer b) Dynamic Programming c) Greedy Method d) Backtracking
CO3	K2	6.	Select the time complexity of the brute force algorithm used to solve the knapsack problem. a) O(n) b) O(n!) c) $O(2^n)$ d) $O(n^3)$
CO4	K1	7.	How many distinct binary search trees can be created out of 4 distinct keys? a) 4 b) 14 c) 24 d) 42
CO4	K2	8.	Select the method used to find the travelling salesman problem. a) A spanning tree b) A minimum spanning tree c) Bellman-Ford algorithm d) DFS traversal
CO5	K1	9.	Which of the following problems is similar to that of a Hamiltonian path problem? a) knapsack problem b) closest pair problem c) travelling salesman problem d) assignment problem
CO5	K2	10.	Which of the following is true about the time complexity of the recursive solution of the subset sum problem? a) It has an exponential time complexity b) It has a linear time complexity c) It has a logarithmic time complexity d) it has a time complexity of O(n2)

Course Outcome	Bloom's K-level	Q. No.	**SECTION – B (5 X 5 = 25 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K2	11a.	Explain asymptotic notation in complexity analysis of algorithms. **(OR)**
CO1	K2	11b.	Discuss about stack and its operations.
CO2	K2	12a.	 Write Inorder , Preorder and Postorder for the above graph. **(OR)**
CO2	K2	12b.	Illustrate Merge sort algorithm with the following elements. 14,33,27,10,35,19,42,44
CO3	K3	13a.	Write about knapsack problem and its types. **(OR)**
CO3	K3	13b.	Determine Minimum Cost Spanning Tree using kruskal algorithm for the given graph  Graph G(V, E)
CO4	K3	14a.	Calculate minimum path cost between multistage graph using dynamic programming. 
CO4	K3	14b.	**(OR)** Write flow shop scheduling algorithm.
CO5	K4	15a.	Write C++ program for 8 Queues problem. **(OR)**
CO5	K4	15b.	Illustrate Branch-N- Bound method with the following example. 

<table>
<tr><th>Course Outcome</th><th>Bloom's K-level</th><th>Q. No</th><th><u>SECTION – C</u> (5 X 8 = 40 Marks)
Answer <u>ALL</u> Questions choosing either (a) or (b)</th></tr>
<tr><td>CO1</td><td>K4</td><td>16a.</td><td>Illustrate binary search tree with the given elements 45, 15, 79, 90, 10, 55, 12, 20, 50
(OR),</td></tr>
<tr><td>CO1</td><td>K4</td><td>16b.</td><td>Analyse Heap sort algorithm with the given elements 81,89,9,11,14,76,54,22</td></tr>
<tr><td>CO2</td><td>K5</td><td>17a.</td><td>Apply BFS algorithm for the given graph.
 

(OR)</td></tr>
<tr><td>CO2</td><td>K5</td><td>17b.</td><td>Apply quick algorithm for the given elements 23,8,28,13,18,26</td></tr>
<tr><td>CO3</td><td>K5</td><td>18a.</td><td>Evaluate Shortest Paths from Source to all Vertices using Dijkstra's Algorithm for the given graph
 

(OR)</td></tr>
<tr><td>CO3</td><td>K5</td><td>18b.</td><td>Evaluate knapsack problem with the given items.
<table>
<tr><td>Item</td><td>A</td><td>B</td><td>C</td><td>D</td></tr>
<tr><td>Profit</td><td>2</td><td>4</td><td>7</td><td>10</td></tr>
<tr><td>Weight</td><td>1</td><td>3</td><td>5</td><td>7</td></tr>
</table>
W = 8</td></tr>
<tr><td>CO4</td><td>K5</td><td>19a.</td><td>Apply optimal binary search tree for the given elements
10, 20, 30, 40, 50, 60, 70
(OR)</td></tr>
<tr><td>CO4</td><td>K5</td><td>19b.</td><td>Evaluate 0/1 knapsack problem for the given items with the capacity = 5kg by using dynamic programming.
<table>
<tr><th>Item</th><th>Weight</th><th>Value</th></tr>
<tr><td>1</td><td>2</td><td>3</td></tr>
<tr><td>2</td><td>3</td><td>4</td></tr>
<tr><td>3</td><td>4</td><td>5</td></tr>
<tr><td>4</td><td>5</td><td>6</td></tr>
</table></td></tr>
<tr><td>CO5</td><td>K6</td><td>20a.</td><td>Consider a graph G = (V, E) shown in fig. we have to find a Hamiltonian circuit using Backtracking method.
 

(OR)</td></tr>
<tr><td>CO5</td><td>K6</td><td>20b.</td><td>Explain subset problem using backtracking.</td></tr>
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