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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
COLLEGE OF ENGINEERING GUINDY
ANNA UNIVERSITY :: CHENNAI - 600 025

B.E. [Electrical and Electronics Engineering] Full-Time
End Semester Examinations :: Dec 2024

EE 5015 - Data Structures and Algorithms [R-2019]

Time: 3 Hrs. **Max. Marks: 100**

Answer ALL Questions

CO1	A comprehensive understanding of fundamentals data structures
CO2	Implement and compare the fundamental data structures
CO3	Develop programs on their own for advanced data structures
CO4	Correlate the use of data structures in real life situations
CO5	Confidence to develop programs for complex problems with improved performance

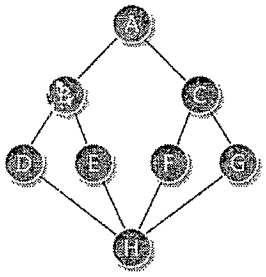
BL - Bloom's Taxonomy Levels
(L1 - Remembering, L2 - Understanding, L3 - Applying, L4 - Analysing, L5 - Evaluating, L6 - Creating)

Part - A [10 x 2 = 20]
[Answer ALL Questions]

Q. No.	Question	Marks	CO	BL
1.	Give the pseudo code for stack insertion.	2	2	1
2.	What is the disadvantage of a normal queue and how to overcome?	2	2	4
3.	Define full and complete binary tree.	2	1	1
4.	Give any two advantages of an AVL tree.	2	1	2
5.	List the different methods for selecting the pivot element in quick sort.	2	3	2
6.	Give the first step of Insertion Sort. What is the need for it?	2	3	4
7.	State any two disadvantages of Greedy Algorithms.	2	2	2
8.	How does a Backtracking Algorithm work?	2	3	2
9.	Give any two properties of Adjacency Matrix.	2	2	4
10.	What is BFS with respect to Binary Trees?	2	2	4

Part - B [5 x 13 = 65]

Q. No.			Question	Marks	CO	BL
11.	a]	i)	Define Stack. List and explain the various main and auxiliary operations on the same with Algorithms.	7	1	2
		ii)	Evaluate the postfix expression **2 5 3 6 + * * 5 / 2 -** using stack?	6	1	3
			Or			
	b]	i)	Give the algorithm for finding the maximum and minimum values in an array along with their positions.	6	3	3
		ii)	Define Queue. Explain the various main and auxiliary operations on the same with Algorithms.	7	1	2
12.	a]	i)	List and explain the different AVL tree rotations with simple examples.	5	1	2

		ii)	Show the step-by-step construction of the AVL Tree for the given Sequence **10, 15, 9, 12, 13, 79, 45, 36, 22.**	8	1	3
			Or			
	b]	i)	Explain the different binary tree traversal techniques with a binary tree with at least 7 nodes.	7	2	2
		ii)	What are possible cases that may arise while deleting a node in a Binary Search Tree? Explain them with algorithms.	6	2	2
13.	a]		Give the Heap Sort Algorithm with proper explanation. Show how the initial Heap is built for the values **1, 3, 5, 4, 6, 13, 10, 9, 8, 15, 17** stored in an array.	13	3	3
			Or			
	b]		Explain the working of Bubble Sort and Selection Sort with Algorithms for the array **{19, 16, 25, 23, 32, 22, 31, 10}**.	13	3	3
14.	a]		Write a note on Divide-and-Conquer algorithms design technique. Explain how the same is applied for merge sort with algorithm.	13	4	3
			Or			
	b]		Give the algorithm for N-Queens problems with proper diagrams and explanations [start with 4-Queens problem].	13	4	3
15.	a]	i)	How are graphs represented in computers?	4	4	2
		ii)	Give the Algorithm for Breadth First Search for Graph Traversal and carry out the same for the following graph [consider G as the source vertex – while adding to the nodes to queue do with alphabetical ordering]: 	9	3	3
			Or			
	b]	i)	Give and explain Dijkstra's and Floy's Algorithms?	8	3	2
		ii)	How Depth First Search works on Graphs?	5	3	3

Part - C[1 x 15 = 15]

Q. No.			Question	Marks	CO	BL
16.	a]	i)	How arrays are used to store binary trees? Give the Algorithm for inserting a given value into an ordered array.	8	5	2
		ii)	Write a detailed note on singly and doubly linked lists along with operations. Give any two advantages and two disadvantages of using the same.	7	2	3

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