U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

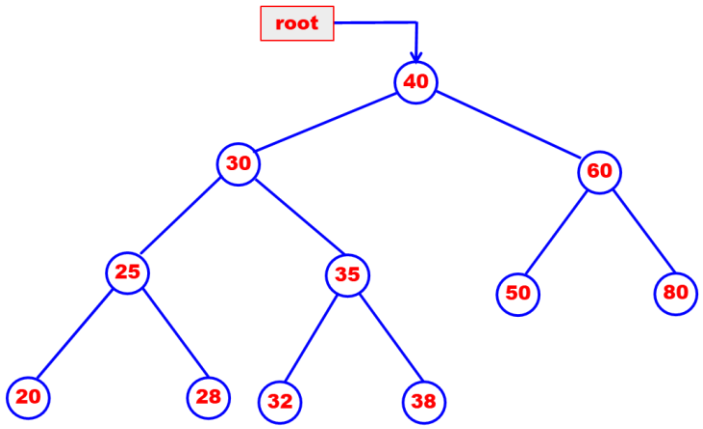
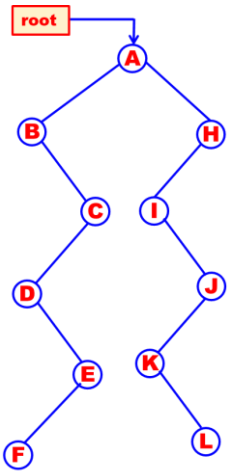
October 2024 Supplementary Examinations

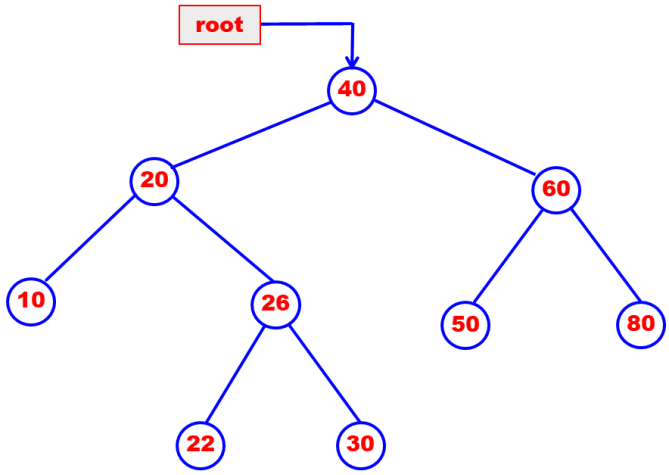
Programme: B.E. **Semester: III**
Branch: Information Science and Engineering **Duration: 3 hrs.**
Course Code: 23IS3PCDSC **Max Marks: 100**
Course: Data Structures

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Compare Static Memory Allocation and Dynamic Memory Allocation.	CO1	PO1	**05**
	b)	Design a C function to split a given Singly Linked List into two lists with one containing data having even numbers and other containing odd numbers.	CO2	PO2	**08**
	c)	Design a C function to find the middle element in a given Singly Linked List.	CO2	PO2	**07**
		OR			
2	a)	Design a C function to Reverse a given Singly Linked List.	CO2	PO2	**04**
	b)	Design a C function to find the n^{th} element from the end of a given Singly Linked List.	CO2	PO2	**07**
	c)	Write a C Program to evaluate a given Polynomial expression. [Assume that the Polynomial has two variables X and Y]	CO3	PO3	**09**
		UNIT - II			
3	a)	Write a C function to insert an element after a given element in a Doubly linked List	CO1	PO1	**08**
	b)	Write a C function to create a Circular Singly Linked List by continuously inserting the elements at the end.	CO1	PO1	**06**
	c)	Write a C function to display the elements of a Doubly Linked List in Reverse order.	CO1	PO1	**06**
		UNIT - III			
4	a)	Compare Iteration and Recursion.	CO1	PO1	**04**
	b)	(i) Write a Recursive function for Tower of Hanoi. Show the function call tracing when n=2. (ii) Write a Recursive function to print a given number in reverse order. Show the tracing for the number 1234.	CO2	PO2	**08**
	c)	Write a C Program to implement Circular Queue using Arrays.	CO3	PO3	**08**

			UNIT - IV			
	5	a)	Write a C function to insert an element into a given Binary Search Tree. Show how 37 is inserted into the following Binary Search Tree.  	*CO2*	*PO2*	**06**
		b)	Construct a Binary Tree when the following Traversals are given: (i) Preorder: A B D I J C E K L M N P Inorder: I J D B C E A L N P M K (ii) Inorder: P N R V Q M S U T O Postorder: P V R Q N U T S O M	*CO2*	*PO2*	**06**
		c)	Write C functions for the following: (i) To find the Maximum element in a Binary Search Tree (ii) To find the Height of a Binary Tree (iii) To find the number of elements with exactly one child in a Binary Tree	*CO3*	*PO3*	**08**
			OR			
	6	a)	Write a C function to construct a Binary Search Tree. Show how a Binary Search Tree is constructed with the following elements in sequence. 40 70 05 65 26 44 85 02	*CO2*	*PO2*	**06**
		b)	Find the Preorder, Inorder and Postorder for the following Binary Tree  	*CO2*	*PO2*	**06**

		c)	Write a C function to delete a given element from a Binary Search Tree. Show how element 26 is deleted from the following Tree.  	*CO3*	*PO3*	**08**
			UNIT - V			
	7	a)	Construct a Splay tree for the following set of integers: **2 , 1 , 4 , 5 , 3 , 6 , 7**	*CO3*	*PO3*	**06**
		b)	Discuss the use of four types of rotations used in AVL tree with examples.	*CO1*	*PO1*	**08**
		c)	With step by step explanation, create a Red-Black tree for the following integers: **9 , 8, 7, 3, 5, 2**	*CO3*	*PO3*	**06**

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