B.M.S. College of Engineering, Bengaluru-560019
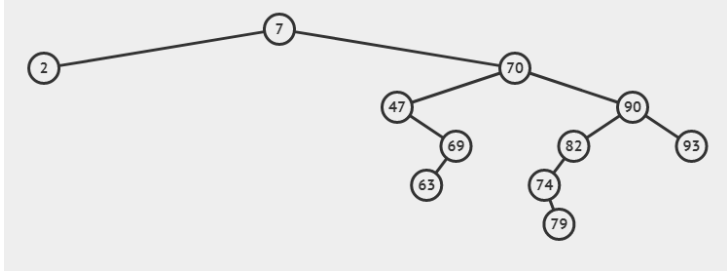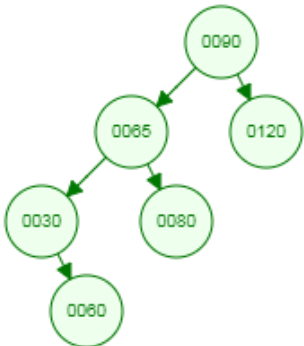
Autonomous Institute Affiliated to VTU

August 2024 Semester End Main Examinations

Programme: B.E.   Semester: III
Branch: Information Science and Engineering   Duration: 3 hrs.
Course Code: 22IS3PCDSC   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.

			UNIT - I	CO	PO	Marks
1	a)		With the neat sketch describe the classification of Data Structures.	CO1	PO1	05
	b)		Write C routines to read 'n' Student record (Student Name, USN, Marks) and to print the student details who has highest marks.	CO3	PO3	10
	c)		Write a C function to insert front in the given Singly Linked list.	CO3	PO3	05
			OR			
2	a)		Elaborate on different dynamic memory management functions used in C programming.	CO1	PO1	05

	b)		A blood bank maintains a list of blood donors. Each donor's name, age, blood group and phone number is stored. Assume 'n' records of donor are stored in a singly linked list. Write C routines for the following:
			  i. Search for a donors for the given blood group
			  ii. Insertion of a new donor.
				CO3	PO3	10

	c)		Write a single C routine to insert at the end and display the contents of singly linked list with header node.	CO3	PO3	05
			UNIT - II			
3	a)		Implement a C routine to delete the first node in Doubly linked list.	CO3	PO3	06
	b)		Design an algorithm to evaluate postfix expression. Using the same, show how the following postfix expression is evaluated **23+6*3-3/.**	CO1	PO1	06
	c)		Write a C routine to convert the given infix expression to postfix and apply the same to convert the given expression A+ (((B – C)*(D - E) + F) / G).	CO1	PO1	08
			UNIT - III			
4	a)		Develop a C program to find and display the Fibonacci series using recursion.	CO3	PO3	05

		b)	Write a C program to implement a linear queue of characters using an array. Routines for enqueue ( ), dqueue( ) and display ( ) operations to be designed.	*CO2*	*PO2*	**10**
		c)	Differentiate between Circular queue and Linear queue.	*CO1*		**05**
			UNIT - IV			
5		a)	Write a iterative C routine to delete a node from Binary Search Tree(BST)	*CO3*	*PO3*	**10**
		b)	Construct a BST for the given pre-order traversal 30,20,10,15,25,23,39,35,42	*CO2*	*PO2*	**04**
		c)	Write the inorder, preorder and postorder traversals for the following Binary tree.	*CO2*	*PO2*	**06**
			OR			
6		a)	Explain array representation of binary trees with an example. Also discuss its advantages and disadvantages.	*CO1*	*PO1*	**05**
		b)	Write C routines to implement the following operations on a Binary Tree: i. Find the smallest element in the tree ii. Post-order traversal iii. Count the total numbers of nodes	*CO2*	*PO2*	**09**
		c)	Why are threaded binary trees needed? Briefly explain a fully threaded binary tree.	*CO1*	*PO1*	**06**
			UNIT - V			
7		a)	Elaborate on the types of rotation used in AVL tree with example.	*CO1*	*PO1*	**08**
		b)	Show the resulting Splay tree after inserting for key values 130 and 95 successively in the below given Splay tree.	*CO2*	*PO2*	**07**
		c)	Write the properties of Red-Black Trees. Construct Red-Back Trees for the following sequence of values: 35, 28, 20, 38, 67, 50, 26, 15.	*CO2*	*PO2*	**05**

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