Question Paper

Exam Date & Time: 27-Jun-2024 (02:30 PM - 05:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

SIXTH SEMESTER B.TECH END SEMESTER MAKEUP EXAMINATIONS, JUNE 2024

OPEN ELECTIVE-FUNDAMENTALS OF DATA STRUCUTRES AND ALGORITHMS [ICT4303]

Marks: 50

Α

Answer all the questions.					
Instr	ructions to C	andidates: Answer ALL questions Missing data may be suitably assumed			
1)		Write functions for the following operations on a singly linked list.	(5)		
	۵)	a. Create the list			
	7.0	b. Concatenate two lists			
	В)	What is an expression tree? Construct an expression tree for the following infix expression. A*B+C+D/E-A*C	(3)		
	C)	Write the values of <i>front</i> and <i>rear</i> after performing the following operations on a circular queue of size 5. Assume that the <i>front</i> and <i>rear</i> are initialised to 0.	(2)		
		add(), add(), add(), delete(), add(), delete(), delete(), add(), add().			
2)		Convert the following infix expression to postfix using a stack: A/B-C*D/(E+F). Write stack	(5)		
	A)	content and output string at each step.			
	B)	Differentiate between pass by value and pass by reference method of parameter passing with	(3)		
		proper examples.			
	C)	Explain self referential structure with an example. Write it's application in data structures.	(2)		
3)		Write the necessary function to sort an array of elements using merge sort. Trace your functions	(5)		
	A)	to sort the following elements.			
)	05, 12, 15, 67, 23, 35, 89, 14, 28, 38, 57, 19			
	B)	List different cases of deleting a node from a Binary Search Tree. Write a recursive function to	(3)		
		do the same.			
	C)	How can you represent a binary tree using an array? Explain with an example.	(2)		
4)		Write all the necessary functions to implement multiple stacks of equal size using an array.	(5)		
	A)				
	B)	Write a function to add two matrices and determine the time complexity using step count	(3)		
		method.			
	C)	Write a formula to find the total number of nodes in a complete binary tree. Calculate the total	(2)		

Duration: 180 mins.

number of nodes in such a tree with 4 levels. Consider the level of root node as 1.

Write a function to traverse a graph using Depth First Search. Trace the function for the graph (5) shown in Fig. Q.5A.



5)



Fig. Q.5A

B)	Given the inorder and postorder traversals of a binary tree, write the binary tree.	(3)
	Inorder: DEBACKGFH	
	Postorder: EDBKGHFCA	
C)	Differentiate between a macro and a function in C programming. Write a macro to find square	(2)
	of an integer.	

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