Code: 21F00104

MCA I Semester Supplementary Examinations July 2024

DATA STRUCTURES

(Master of Computer Applications)

Time: 3 hours | Max. Marks: 60

Answer all the questions

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1	(a)	Discuss about loop control statements in C with examples.	6M
	(b)	Write C program to concatenate two strings without using built-in function.	6M
		OR	
2	(a)	Write a C program to swap two numbers using pointers.	6M
	(b)	Discuss about string functions in C.	6M
3	(a)	Convert to postfix expression: (a+b)*d+e/(f+a*d)+c.	6M
	(b)	Write a C function to convert infix to postfix expression.	6M
		OR	
4	(a)	Write a C program to perform push and pop operations on stack.	6M
	(b)	Discuss about how to evaluate a postfix expression using stacks.	6M
5	(a)	Explain the differences between single and double linked list.	6M
	(b)	Write a C program to add two polynomial expressions using single linked list.	6M
		OR	
6	(a)	Discuss about deleting an element from a double linked list.	6M
	(b)	Write a C program to add an element at the end in a double linked list.	6M
7	(a)	What is a graph? What are the different ways of representing a graph?	6M
	(b)	Discuss about deleting an element from max heap.	6M
		OR	
8	(a)	Write C recursive function for post-order tree traversal technique.	6M
	(b)	Discuss about BFS with an example.	6M
9	(a)	L = (12, 2, 16, 30, 8, 28, 4, 10, 20, 6, 18) is the given list of elements. Sort the elements using bubble sort and state the number of iterations required to sort.	6M
	(b)	Write a C program to sort the elements using bubble sort.	6M
		OR	
10	(a)	List out the differences between linear search and binary search.	6M
	(b)	Apply binary search on {23, 71, 66, 44, 89, 65, 98, 33} with key as 66.	6M

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Code: 21F00104

MCA I Semester Regular & Supplementary Examinations February 2024

DATA STRUCTURES

(Master of Computer Applications)

Time: 3 hours Max. Marks: 60

Answer all the questions

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1	(a)	Explain in detail about different types of arrays.	6M
	(b)	Given an array a[n] , write a c program to produce the array z[n] such that z[0] = a [n-1], z[1] = a[n-2], ••• ,z[n-2] = a[1], z[n-1] = a[0].	6M
		OR	
2	(a)	Differentiate between structures and union. Write C program to add two complex numbers using structures.	6M
	(b)	Write a function, strdel that accepts a string and a character. The function returns string with the first occurrence of character removed.	6M
3	(a)	Differentiate between queues and stacks.	6M
	(b)	List applications of queues. Write C program to implement queue operations using arrays.	6M
		OR	
4	(a)	The Fibonacci sequence is; 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, ■ ■ ■ It is defined as $F_0 = 0$, $F_1 = 1$, and $F_i = F_{i-1} + F_{i-2}$, $i >= 2$. Write a recursive function, fibo(n), that returns the nth fibonacci number. Show the status of the system stack for the call fibo(4).	6M
	(b)	Explain the applications of stacks.	6M
5	(a)	How to represent stacks using linked list? Give the suitable example.	6M
	(b)	List the applications of single linked list.	6M
		OR	
6	(a)	Discuss about circular linked list and inserting an element at the front in circular linked list.	6M
	(b)	Write a C function to find the length of circular linked list.	6M
7	(a)	What is a tree? How would you represent tree using a linked list.	6M
	(b)	Explain inorder traversal of a binary tree with example.	6M
		OR	
8	(a)	Write a C program to illustrate DFS.	6M
	(b)	What is spanning tree? Discuss kruskal's algorithm to obtain minimum cost spanning tree.	6M
9	(a)	Explain quick sort algorithm with tracing.	6M
	(b)	Derive the complexity of quick sort algorithm.	6M
		OR	
10	(a)	Discuss in detail about the linear search with its algorithm and a simple example.	6M
	(b)	Discuss about merge sort algorithm with an example.	6M

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Code: 21F00104

MCA I Semester Regular & Supplementary Examinations March 2023

DATA STRUCTURES

(For students admitted in 2021 & 2022 only)

Time: 3 hours Max. Marks: 60

Answer all the questions

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1 (a) Write a C program to maintain a record of "n" student details using an array of structures with four fields (Roll number, Name, Marks, and Grade). Each field is of an appropriate data type. Print the marks of the student given student name as input. 6M

(b) What is dynamic memory allocation? Write and explain the different dynamic memory allocation functions in C. 6M

OR

2 (a) Write a program in C to print the numbers from 4 to 14 and their square. 6M

(b) Briefly explain any four string handling functions. 6M

3 (a) Evaluate the following postfix expression: 6M
6,5,^,3,2,*,+,8,7,4 -

(b) What is Priority queue? Explain with suitable example. 6M

OR

4 (a) Define and explain the stack data structure with suitable example. Give algorithms for Push, Pop, Stack empty and Stack full functions. 6M

(b) Write an algorithm to implement queue using stack. 6M

5 (a) Write an algorithm to insert new node at the beginning, at middle position and at the end of a singly linked list. 6M

(b) What is linked list? How it is represented in memory? Briefly explain header linked list. 6M

OR

6 (a) Explain following applications of a linked list for: 6M
(I) Representation of a polynomial expression (II) sparse matrix manipulation.

(b) Write an algorithm to delete an element anywhere from doubly linked list. 6M

7 (a) Explain sequential representation of graphs in memory. 6M

(b) What are connected components of graph? Is there any method to find out all the connected components of graph? Explain. 6M

OR

8 (a) Write an algorithm to represent binary tree using arrays and linked list. 6M

(b) What is minimum cost spanning Tree? How many Minimum spanning trees can be formed from a given graph? Explain the process of finding the minimum spanning tree with suitable example. 6M

9 (a) Arrange the following list of elements in ascending order using heap sort: 6M
9, 3, 5, 27, 4, 67, 18, 31, 13, 20, 39, 21.
Clearly show the sorting process at each step.

(b) What is sequential search? Write an algorithm for the same. 6M

OR

10 (a) Explain Insertion sort in details. Write an algorithm for it. Discuss the complexity of insertion sort. Compare the complexity with bubble sort. 6M

(b) Write an algorithm for quick sort and derive its time complexity. 6M

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