Code No: MC2014/R20

MCA I Semester Regular Examinations, July-2021

Data Structures

Time: 3 Hours | Max. Marks: 70

Answer any FIVE Questions One Question From Each Unit
All Questions Carry Equal Marks

UNIT-I

1. a Write an algorithm and flowchart to compute roots of quadratic equation 7M
   b Define a data type. Mention the different data types supported by C language, giving an example to each. 7M

OR

2. a Compare and contrast between if-else and switch –case statements 7M
   b Write a program to compute roots of quadratic equation using switch-case statement. 7M

UNIT-II

3. a Develop a C program to read two number and a function to swap these number using pointers 7M
   b How to pass arrays as parameters to functions? Explain with an example. 7M

OR

4. a What is a pointer? Explain dynamic memory management 7M
   b Explain various parameter passing mechanisms. 7M

UNIT-III

5. a Write an algorithm to delete an element anywhere from doubly linked list. 7M
   b Show how to reverse a single linked list. 7M

OR

6. a Write an algorithm to delete an element from doubly linked list. 7M
   b Compare singly and circular linked list while performing insertion and deletion operations. 7M

UNIT-IV

7. a Discuss Briefly about linear probing, quadratic probing with example. 10M
   b Illustrate the difference between stack and queue 4M

OR

8. a Write an algorithm for basic operations of stack. 7M
   b Write an algorithm to push and pop an element from linked stack. 7M

UNIT-V

9. a Create binary search tree for the following elements (23, 12, 45, 36, 5, 15, 39, 2, 19). Discuss about the height of the above binary search tree. 7M
   b What is a binary search tree? Write an algorithm for inserting and deleting a node in a binary search tree. 7M

OR

10. a A binary tree has seven nodes. The Preorder and Post order traversal of the tree are given below. Can you draw the tree? Justify. 7M
    Preorder : GFDABEC
    Post order : ABDCEFG
    b Explain the iterative merge sort and recursive merge sort algorithms with an example. 7M

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H.T.No: 21A91F0075 Course Code: 203MC1T04

ADITYA ENGINEERING COLLEGE (A)

MCA – I Semester End Examinations Regular & Supple (AR20) – MAY 2022

DATA STRUCTURES

(Master of Computer Applications)

Time: 3 hours **Max. Marks: 70**

Answer ONE question from each unit
All Questions Carry Equal Marks
All parts of the questions must be answered at one place only

UNIT – I					
1	a	What is a variable? What are the rules for declaring variables? Give examples for valid and invalid variables?	K2	CO1	[8M]
	b	Explain about different types of branching statements in C	K2	CO1	[6M]
		OR			
2	a	Write a C program for to find a sum of series 1! +2! +3! +----+n!	K2	CO1	[7M]
	b	Describe while and do-while loop with example each.	K2	CO1	[7M]
UNIT – II					
3	a	Summarize the declaration and initialization of structure with an example	K2	CO2	[6M]
	b	What is pointer? What are the features of pointers? Write a C program to print address of variable and data with pointer.	K2	CO2	[8M]
		OR			
4		Explain different types of file handling functions in C with example	K2	CO2	[14M]
UNIT – III					
5	a	Discuss single linked list and doubly linked list	K2	CO3	[7M]
	b	How circular linked list is organized. Discuss its operations	K2	CO3	[7M]
		OR			
6	a	Explain the types of data structures in detail	K2	CO3	[9M]
	b	What is recursion discuss types recursion with an example.	K2	CO3	[5M]
UNIT – IV					
7		What is hash function? Explain collision resolution methods of the hashing	K2	CO5	[14M]
		OR			
8	a	Write the program to implement Push and Pop operation in the stack	K2	CO5	[7M]
	b	Discuss array and linked list representation of queue.	K2	CO5	[7M]
UNIT – V					
9		Write a program to implement selection sort and calculate its complexity with example	K2	CO4	[14M]
		OR			
10	a	What is BST? Explain the operations of BST	K2	CO4	[4M]
	b	Construct Binary Search Tree for following elements 47, 12, 75, 88, 90, 73, 57, 1, 85, 50, 62 apply inorder, preorder, postorder traversal.	K2	CO5	[10M]

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H.T.No: | | | | | | | | | | |

Course Code: **203MC1T04**

ADITYA ENGINEERING COLLEGE (A)

MCA – I Semester End Examinations Regular (AR20) – AUG 2021

DATA STRUCTURES

Time: 3 hours **Max. Marks: 70**

Answer ONE question from each unit
All Questions Carry Equal Marks (5 x 14 = 70M)
All parts of the questions must be answered at one place only

UNIT – I

1	a	Explain arithmetic, logical and bitwise operators with examples.	K2	CO1	[6M]
	b	Write a C program to illustrate switch and if-else statements.	K2	CO1	[8M]
		OR			
2	a	What is the need of do-while and while loops? Discuss about their usage. Distinguish between them.	K2	CO1	[6M]
	b	Write a program to demonstrate passing an array argument to a function. Consider the problem of finding largest of N numbers defined in an array.	K2	CO1	[8M]

UNIT – II

3	a	Explain function prototype and explain different methods to call the functions.	K3	CO2	[7M]
	b	Define a structure. Describe how to declare and initialize structure and its members with an example.	K3	CO2	[7M]
		OR			
4	a	What is a user defined function? When these functions are useful? How a function is declared and what are the rules followed to call a function.	K3	CO2	[6M]
	b	Explain about the fopen, fclose, feof, fprintf, and fscanf, functions.	K3	CO2	[8M]

UNIT – III

5	a	List various operations of linked list and explain how to insert a node anywhere in the single linked list.	K3	CO3	[8M]
	b	Write an algorithm to delete an element anywhere from doubly linked list.	K3	CO3	[6M]
		OR			
6	a	Explain the advantages and disadvantages of the recursive algorithms compared to non-recursive algorithms.	K3	CO3	[6M]
	b	What is the difference between Circular linked list and doubly linked list. Mention the applications of each type of list.	K3	CO3	[8M]

UNIT – IV

7	a	Convert given Infix expression: **(a + b * c ^ d) * (e + f / g)** to Postfix expression using Stack and show the details of Stack at each step of conversion. (Note: ^ indicates exponent operator)	K3	CO4	[7M]
	b	Discuss various collision resolution techniques with suitable examples.	K3	CO4	[7M]

(P.T.O)

OR

8 a Explain the basic operations of stack with pseudo code. K3 CO4 [8M]

b Discuss about implementation of queues using linked list. K3 CO4 [6M]

UNIT – V

9 a Describe insertion sort algorithm and trace the steps of insertion sort for sorting the list **12, 19, 33, 26, 29, 35, 22, 37**. Find the total number of comparisons made. K4 CO5 [8M]

b Write in-order, pre-order and post-order traversal of a binary tree. K4 CO5 [7M]

OR

10 a Create binary search tree for the following **elements 23, 12, 45, 36, 5, 15, 39, 2, 19**. Discuss about the height of the above binary search tree. K4 CO5 [7M]

b Give an algorithm for quick sort and explain its time complexity. Trace the algorithm for the following data: **65 70 75 80 85 60 55 50 45.**

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21P31F0034

Code No: MC2014/R20

MCA I Semester Regular/Supplementary Examinations, May-2022

DATA STRUCTURES

Time: 3 Hours | Max. Marks: 70

Answer any FIVE Questions One Question From Each Unit
All Questions Carry Equal Marks

UNIT-I

1. a How the Precedence and Associativity rules of operators help in executing a 'C' expression? What is the output of the following C code? Give Explanation. 7M

```
#include <stdio.h>
int main()
{
int h = 7;
int b = 3 * 5 + 2 * 3 < h*4 ?3 : 2;
printf("%d", b);
return 0;
}
```

   b Give the syntax of various Loop control statements supported by C. Explain their execution behavior with neat flowcharts. 7M

OR

2. a Write a C program to display the sum of the series 1 + 1/2 + 1/3 + 1/4 + 1/5 + ... 1/N on console, where the value of N is taken as input. 7M

   b Explain the memory allocation strategies for various types of arrays supported by C programming with neat diagrams. 7M

UNIT-II

3. a Explain the concept of structures and unions with suitable examples. 7M

   b Distinguish between char *S and char S [ ] with a sample C program. 7M

OR

4. a Write a C program to add two distances given as input in feet and inches using structures. (*Hint*: One feet = 12 inches) 7M

   b Give the syntax for opening files in C programming. Explain various modes of opening files with an example C program. 7M

UNIT-III

5. a How to measure the complexity of an algorithm? Briefly discuss various notations used for it. 6M

   b What are the advantages of Circular Linked lists over other types of linked lists? Depict the insert, delete and search operations on Circular Linked lists with neat diagrams. 8M

OR

6. a Why selecting appropriate data structure is so important in computer applications? Elaborate on the classification of data structures. 6M

   b With neat diagrams, explain the Insert and Delete operations in Doubly Linked List data structure. 8M

UNIT-IV

7. a Describe the five basic operations which can be performed on Stack data structure with suitable diagrams where ever necessary. 7M

   b Consider a Hash table of size 7 with hash function is h(k) = k % m. Insert the following elements {99,71,18,15,12,81} into a Hash table and use Quadratic probing approach to resolve the collision. 7M

OR

8. a List and explain any four significant applications of Queue data structure in computer system. 6M

   b What are the significant advantages of Extendible hashing over Static hashing implementations? Explain the concept of Extendible hashing technique with an example. 8M

UNIT-V

9. a Explain the principle of Quick Sort algorithm with an example. 7M

   b Show the resulting Binary Search Tree after inserting the elements 1, 4, 7, 10, 17, 21, 31, 25, 19, 20, 28, 42 in order into an empty tree. 7M

OR

10. a How many passes are required to sort the following list of elements 24, 98,29,24,77, 48, 17, 65, 14, 30 using iterative merge sort. 7M

    b Explain in detail various tree traversals techniques. Discuss their applications. 7M

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