CMR TECHNICAL CAMPUS
UGC AUTONOMOUS
B. Tech. III Semester Regular/Supply End Examinations, Feb-2023
Data Structures using C
Common to CSE, IT, CSM, CSD, CSG, AIML

Time: 3 Hours

Max. Marks: 70

Note

i. This Question paper contains Part- A and Part- B.
ii. All the Questions in Part A are to be answered compulsorily.
iii. All Questions from Part B are to be answered with internal choice among them.

****

PART-A

10 X 02 = 20 Marks

			Marks	CO	BL
1.	a	Define abstract data type.	2	CO1	L1
	b	Write a pseudocode for checking stack is empty.	2	CO1	L2
	c	List out the operations performed in dictionary with example.	2	CO2	L2
	d	Define hash function.	2	CO2	L1
	e	Differentiate between Binary tree and binary search tree.	2	CO3	L3
	f	List out the applications of Red-Black tree.	2	CO3	L2
	g	What are the applications of graph?	2	CO4	L2
	h	What is the time complexity of merge sort?	2	CO4	L3
	i	List out the algorithms used for pattern matching.	2	CO5	L2
	j	Write short notes on suffix tries.	2	CO5	L2

PART- B

5 X 10 = 50 Marks

|			Marks	CO	BL
2.	a	Write a procedure to do different types of insertion and deletion elements from singly linked list.	10	CO1	L3
		OR			
3.	a	Define Queue ADT. Write an algorithm for different operations performed on Queue using array.	6	CO1	L3
	b	Convert the following infix expression into postfix notations: a+b*c/d–f+g	4	CO1	L4
4	a	Write the Program to implement the following operations on binary search tree: Perform insert and delete operations on binary search tree	10	CO2	L3

OR

5	a	Define collision in hashing. Explain collision resolution techniques in context of hashing with example.	10	CO2	L3
6		Write an algorithm to AVL tree insertion. Insert the following elements in an empty tree and balance the tree after each insertion: Data: 3, 6, 5, 8, 19, 10, 2, 17,13,11,1,4	10	CO3	L4

OR

7	a	Explain in detail about splay tree with its properties, types with suitable examples.	7	CO3	L3
	b	Explain the acceptable balancing factor of AVL tree.	3	CO3	L2
8	a	Perform merge sort algorithm on the following values: 58, 8, 21, 64, 98, 34, 28, 13, 45, 59, 68	5	CO4	L4
	b	Write an algorithm for heap sort.	5	CO4	L3

OR

9	a	Explain in detail about BFS and DFS algorithm. Apply the same to the following graph:	10	CO4	L4
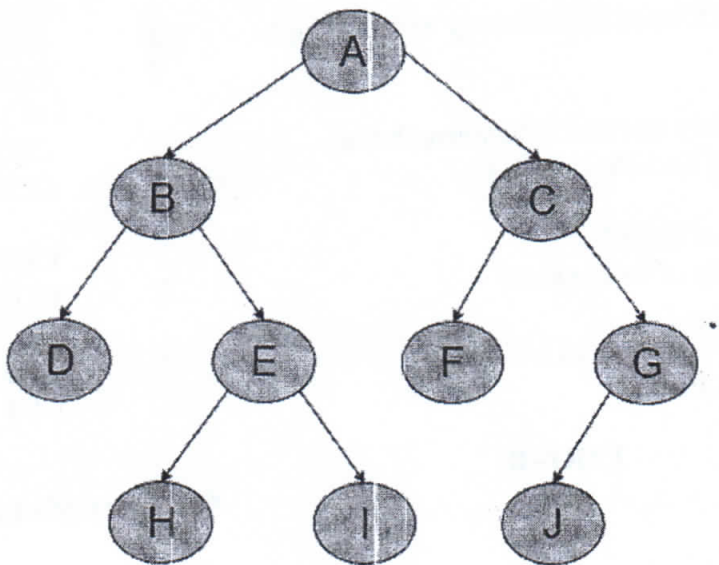
10	a	Explain in detail about the Brute-Force and Bayer Moore Pattern Maching algorithms with proper examples.	10	CO5	L3

OR

11	a	Explain in detail about the Knuth-Morris-Pratt algorithm with an example.	10	CO5	L3

CO : Course Outcomes

BL	: Bloom's Taxonomy Levels	**L 1 : Remembering**	**L 2 : Understanding**
		L 3 : Applying	**L 4 : Analysing**
		L 5 : Evaluating	**L 6 : Creating**

*****

CMR TECHNICAL CAMPUS
UGC AUTONOMOUS
B.Tech - III Semester, Regular End Examinations, Feb-2022
Data Structures using C [20CS302PC]
(Common to CSE, IT, CSD & CSM)

Time: 3 Hours

Max. Marks: 70

Answer Any Five Questions
All Questions Carry Equal Marks

5X 14 = 70 Marks

1. a. Explain linked list implementation of queues. [7M]

   b. Distinguish between stack and queue. [7M]

2. a. Explain Stack ADT and its operations. [7M]

   b. Write an algorithm to convert infix expression to postfix expression. [7M]

3. a. Explain Rehashing in detail. [7M]

   b. Demonstrate skip list operations. [7M]

4. a. Explain linear probing with an example. [7M]

   b. Write short notes on separate chaining. [7M]

5. a. How to construct AVL tree.Explain with an example? [7M]

   b. What are the properties of red-black tree? [7M]

6. a. What are the advantages of binary search tree? [5M]

   b. Explain splay trees with an example? [9M]

7. a. Write an algorithm to sort elements using Heap sort technique? [7M]

   b. Demonstrate DFS using suitable example? [7M]

8. a. How does the Boyer-Moore algorithm work? [7M]

   b. What are the different types of tries? [7M]

******

CMR TECHNICAL CAMPUS
UGC AUTONOMOUS
B.Tech - III Semester, Supply Examinations, July-2022
Data Structures using C[20CS302PC]
(Common to CSE, CSD, CSM & IT)

Time: 3 Hours   Max. Marks: 70

Answer Any Five Questions
All Questions Carry Equal Marks

5 X 14 = 70 Marks

1. a. Explain various operations that are performed on queue with suitable algorithms.[7M]

   b. Explain stack ADT operations with suitable example.   [7M]

2. a. Explain the Infix to postfix conversion using stack ADT.   [7M]

   b. Write an algorithm to insert new node at the beginning, at middle position and at the end of a Singly Linked List.   [7M]

3. Explain how data is inserted and deleted from dictionaries while it is implemented using list data structure.   [14M]

4. The keys 12,18,13,2,3,23,5,and 15 are inserted into an initially empty hash table of length 10 using linear probing with hash function h(k)= k mod 10. What is the resultant hash table?   [14M]

5. a. Show the result of inserting 3 , 1 , 4 , 6 , 9 , 2 , 5 , 7 into an initially empty AVL tree?
                                                                           [7M]
   b. Show the result after each insertion of AVL Tree and also show the result after deletion of the root?

                                                                           [7M]

6. What are the properties that are satisfied by red- black tree? Explain LLr, LRr,RRr, RLr rotations.   [14M]

7. a. Explain about the DFS with example.   [7M]
   b. Explain merge sort with an example.   [7M]

8. a. Explain about the KMP pattern matching algorithm. Illustrate the operations of KMP pattern matching algorithm with example.   [7M]

   b. Discuss standard Tries and Compressed Tries.   [7M]

******

CMR TECHNICAL CAMPUS
UGC AUTONOMOUS
B. Tech. III Semester Supply End Examinations, February-2024
Data Structures using C
Common to CSE, IT, CSM, CSD, CSG, AIML

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

Note
i. This Question paper contains Part- A and Part- B.
ii. All the Questions in Part A are to be answered compulsorily.
iii. All Questions from Part B are to be answered with internal choice among them.

****

PART-A

10 X 02 = 20 Marks

			Marks	CO	BL
1.	a	Explain the purpose of abstract data type.	2 Marks	CO1	L2
	b	List the applications of stack.	2 Marks	CO1	L1
	c	List the disadvantages of skip list.	2 Marks	CO2	L1
	d	What is Hash table. List any three applications of Hash Table.	2 Marks	CO2	L1
	e	What are the properties of Binary search tree.	2 Marks	CO3	L1
	f	Is AVL tree a Self-balancing tree. Justify	2 Marks	CO3	L5
	g	List the properties of a Graph.	2 Marks	CO4	L1
	h	What is Heap sort.	2 Marks	CO4	L1
	i	What is pattern matching. Give an example.	2 Marks	CO5	L1
	j	Write the purpose of using compressed tries.	2 Marks	CO5	L1

PART- B

5 X 10 = 50 Marks

			Marks	CO	BL
2.	a	Explain with an example the different operations on linked list	5 Marks	CO1	L2
	b	Implement linked list using an array	5 Marks	CO1	L2
		OR			
3	a	Give the structure of Queue ADT. Explain the operations in it.	5 Marks	CO1	L2
	b	What is a stack? Explain overheads caused by stack in recursion with a suitable Example.	5 Marks	CO1	L2
4	a	Discuss the operations of skip list with a suitable example.	5 Marks	CO2	L2
	b	Using the hash function 'key mod 7', insert the following sequence of keys in the hash table-	5 Marks	CO2	L3

50, 700, 76, 85, 92, 73 and 101.Use separate chaining technique for collision resolution.

OR

5	a	Write an algorithm for performing insertion operation on skip list	5 Marks	CO2	L1
	b	Write a C code to implement hash table and perform operation using quadratic probing Technique.	5 Marks	CO2	L2
6	a	Explain Insertion and Searching operation on binary search tree with a suitable example.	5 Marks	CO3	L2
	b	With a suitable example explain different kinds of rotations possible on AVL Trees.	5 Marks	CO3	L2

OR

7	a	Compare and contrast Binary search tree and AVL trees.	5 Marks	CO3	L3
	b	Write a solution for finding the maximum height of any AVL tree with 10 nodes?	5 Marks	CO3	L3
8	a	Discuss the different approaches of representing a graph with an example.	5 Marks	CO4	L2
	b	Explain the procedure of heap sort with an Example.	5 Marks	CO4	L2

OR

9	a	What is graph? Explain different Terminology of Graphs.	5 Marks	CO4	L2
	b	Differentiate Heap sort and Merge sort.	5 Marks	CO4	L3
10	a	With an algorithm explain Boyer moore Pattern matching algorithm.	5 Marks	CO5	L2
	b	Explain the uses of suffix tries with an example	5 Marks	CO5	L2

OR

11	a	Explain the applications of pattern matching algorithms	5 Marks	CO5	L2
	b	Explain about standard trie with an example	5 Marks	CO5	L2

CO   : Course Outcomes

BL   : Bloom's Taxonomy Levels   L 1 : Remembering   L 2 : Understanding

L 3 : Applying   L 4 : Analysing

L 5 : Evaluating   L 6 : Creating

*****