

CourseName:Data Structures

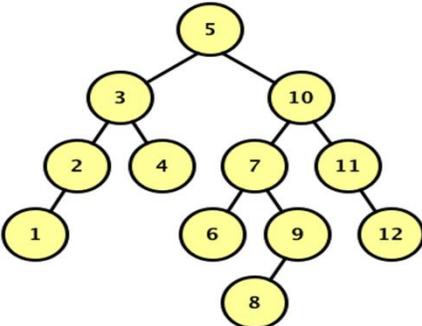
CourseOutcomes(CO):

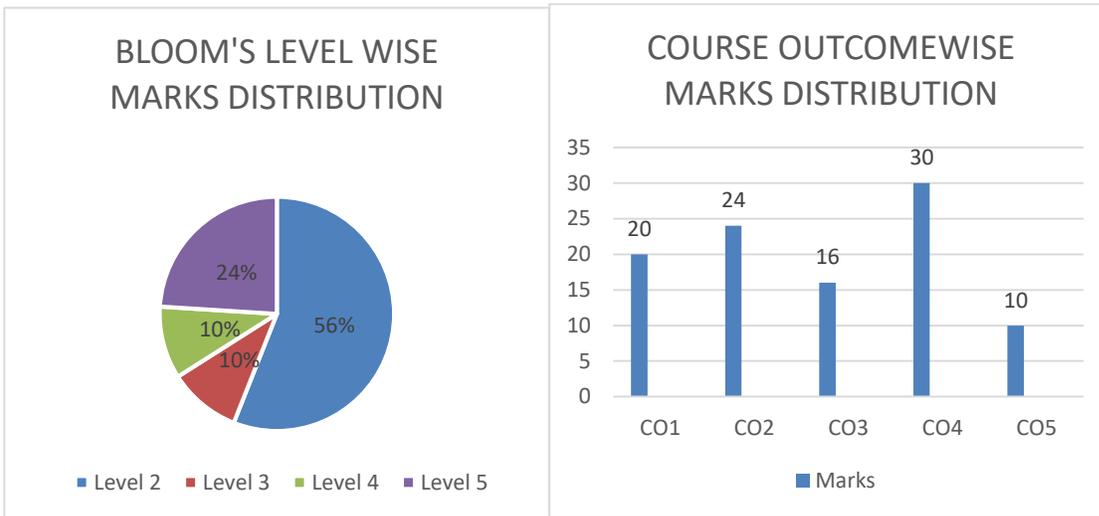
1. Discuss the C language features and analyze the differences between recursive and iterative programming structures
2. Analyze the role of data structures in structuring and manipulating data and implement them using array or list representation
3. Discuss the properties, operations, applications, strengths and weaknesses of the different data structures and their effect on algorithms
4. Implement abstract data type for Tree non-List linear data structure and apply them to problem solutions.
5. Discuss the file structures and storage management for efficient access of data

Question Paper
Total Duration (H:M): 3:00
Course: Data Structures
Maximum Marks: 100

Note: Attempt all questions.

Q. No	Questions	Marks	CO	BL
1a)	When doubly Linked list can be represented as a Circular linked list?	4	CO3	L2
1b)	Difference between Linear data Structure and non-linear data structure?	6	CO4	L4
1c)	Write all the steps to convert a general tree into a binary tree with neat labeled flow diagram.	10	CO4	L2
2a)	You are given an unsorted array $A = A [1 \dots n]$ containing n distinct integers. Design an algorithm that outputs the smallest k elements in the array A . The running time of your algorithm should be $O(n + k \log n)$. Give pseudocode and discuss running time.	4	CO2	L5
2b)	What are enqueue and dequeue operations?	6	CO3	L2
2c)	Given Infix Expression: $((H * (((A + ((B + C) * D)) * F) * G) * E)) + J)$; convert it into post fix and prefix notation?	10	CO1	L5

3a)	Prove that the maximum number of edges that a graph with n Vertices is $n*(n-1)/2$.	4	CO4	L4
3b)	How the queue is implemented by linked list and discuss all the steps and algorithms for insert and delete from the queue is implemented by linked list.	6	CO3	L2
3c)	a. List out the steps involved in deleting a node from a binary search tree. b. Write the advantages of threaded binary trees.	10	CO2	L3
4a)	Define a heap. How can it be used to represent a priority queue?	4	CO5	L2
4b)	Define sorting and what do you mean by internal and external sorting?	6	CO5	L2
4c)	How is the insertion sort done with the array and also write a pseudocode for insertion sort?	10	CO1	L2
5a)	Disadvantages of Array over Linked List and also mention disadvantages of linked list over array?	4	CO2	L5
5b)	Difference between Stack queue and linked list and explain how do you test for an empty stack?	6	CO2	L5
5c)	<p>Given the following AVL Tree:</p>  <pre> graph TD 5((5)) --- 3((3)) 5 --- 10((10)) 3 --- 2((2)) 3 --- 4((4)) 2 --- 1((1)) 4 --- 7((7)) 7 --- 6((6)) 7 --- 9((9)) 9 --- 8((8)) 10 --- 11((11)) 11 --- 12((12)) </pre> <p>(a) Draw the resulting BST after 5 is removed, but before any rebalancing takes place. Label each node in the resulting tree with its balance factor. Replace a node with both children using an appropriate value from the node's left child.</p> <p>(b) Now rebalance the tree that results from (a). Draw a new tree for each rotation that occurs when rebalancing the AVL Tree (you only need to draw one tree that results from an RL or LR rotation). You do not need to label these trees with balance factors.</p>	10	CO4	L2



BL–Bloom’s Taxonomy Levels (1-Remembering, 2-Understanding, 3 Analyzing, 5 –Evaluating, 6-Creating)

–Applying, 4–

CO–Course Outcomes