SIDDARTH INSTITUTE OF ENGINEERING AND TECHNOLOGY :: PUTTUR

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QUESTION BANK (DESCRIPTIVE)

Subject with Code : Data Structure(23CS0504)   **Year &Sem:** I-B.Tech & II-Sem
Course & Branch: CSE&Allied   **Regulation: R23**

UNIT-I
INTRODUCTION TO LINEAR DATA STRUCTURE

1.	a)	What is a data structure?	[L1, CO1]	**[2M]**
	b)	Define ADT (Abstract Data Type).	[L1, CO1]	**[2M]**
	c)	Compare binary search and linear search techniques.	[L2, CO1]	**[2M]**
	d)	What is the need of data structures?	[L2, CO1]	**[2M]**
	e)	List some common data structures.	[L1, CO1]	**[2M]**
2.	a) What do you mean by Searching? Explain sequential search.		[L3,CO1]	**[5M]**
	b) Explain about binary search.		[L2, CO1]	**[5M]**
3.	a) How data structures are classified?		[L6,CO1]	**[5M]**
	b) Differentiate linear and non-linear data structure.		[L2, CO2]	**[5M]**
4.	a) Define sorting. Explain any one sorting techniques?		[L1,CO1]	**[5M]**
	b) Define ADT (Abstract Data Type) Mention the advantages of ADT.		[L4,CO1	**[5M]**
5.	Discuss the algorithm to sort the elements using Bubble sort.		[L2,CO1]	**[10M]**
6.	a) Sort the following numbers using Bubble sort : 14,33,27,35,10.		[L4,CO1]	**[5M]**
	b)	Explain insertion sort with an example.	[L3,CO1]	**[5M]**
7.	Sort the following numbers using selection sort : 45, 25, 10, 2, 9, 85, 102, 1		[L4,CO1]	**[10M]**
8.	a)	Explain about Space Complexities.	[L2,CO1]	**[5M]**
	b)	Explain about Time Complexities.	[L2,CO1]	**[5M]**
9.	Explain about classification of Data Structures.		[L2,CO1]	**[10M]**
10.	a)	Write a C program to sort the elements using bubble sort.	[L5,CO1]	**[5M]**
	b)	Sort the following numbers using Insertion sort : 24,9,29,14.19,27,50,10,30	[L4,CO1]	**[5M]**
11.	a)	Write a C program to sort the elements using selection sort.	[L5, CO1]	**[5M]**
	b)	Write a C program to sort the elements using insertions sort.	[L5, CO1]	**[5M]**

UNIT-II
LINKED LIST

1.	a)	What are the ways of implementing linked list?	[L1, CO2]	**[2M]**
	b)	What are the types of linked lists?	[L1, CO2]	**[2M]**
	c)	How the singly linked lists can be represented?	[L2, CO2]	**[2M]**
	d)	How the doubly linked list can be represented?	[L2, CO2]	**[2M]**
	e)	What are the advantages of linked list?	[L1, CO2]	**[2M]**
2.	a)	Explain the operations of singly linked lists.	[L3, CO2]	**[5M]**
	b)	What are the advantages of linked list?	[L2, CO2]	**[5M]**
3.	a)	Explain the insertion operation in Single linked list. How nodes are inserted after a specified node.	[L6, CO2]	**[5M]**
	b)	Illustrate the use of linked list.	[L3, CO2]	**[5M]**
4.	a)	Explain the operations of doubly linked lists.	[L1, CO2]	**[5M]**
	b)	Explain the operations of circularly linked lists.	[L4, CO2]	**[5M]**
5.		Explain the applications of linked lists in detail.	[L2, CO2]	**[10M]**
6.	a)	Advantages of Linked List over Array.	[L4, CO2]	**[5M]**
	b)	Explain Representation of linked list.	**[**L3, CO2]	**[5M]**
7.		What is the draw backs of single linked list? Explain how to implement insert and traverse operations in circular linked list.	[L4, CO2]	**[10M]**
8.	a)	Create a Doubly linked list by inserting following elements in a list 13,45,23,20,25.	[L6, CO2]	**[5M]**
	b)	Write algorithm for insert and delete a node from doubly linked list.	[L2, CO2]	**[5M]**
9.		What is linked list? Write and explain the algorithm for crate, insertion and traverse operations in doubly linked list with example.	[L2, CO2]	**[10M]**
10.	a)	Explain the circular linked list in detail.	[L5, CO2]	**[5M]**
	b)	List the advantages of circular linked list.	[L4, CO2]	**[5M]**
11.	a)	Differentiate linked list and Array.	[L2, CO2]	**[5M]**
	b)	Specify the use of Header node in a linked list.	[L2, CO2]	**[5M]**

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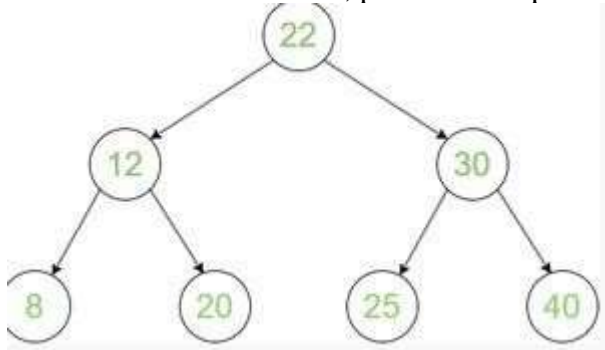
UNIT-III
STACKS

1.	a)	What are the various Operations performed on the Stack?	[L1, CO3]	**[2M]**
	b)	Define Stack.	[L1, CO3]	**[2M]**
	c)	Write the postfix form for the expression -A+B-C+D?	[L2, CO3]	**[2M]**
	d)	Give one example of a problem where backtracking algorithms are used.	[L2, CO3]	**[2M]**
	e)	List any four applications of stack.	[L1, CO3]	**[2M]**
2.		Write an algorithm for Push and Pop operations on Stack using Arrays.	[L3,CO3]	**[10M]**
3.		Write an algorithm for Push and Pop operations on Stack using Linked list.	[L6,CO3]	**[10M]**
4.	a)	Write an algorithm for converting an Infix to Postfix notation using stack.	[L1,CO3]	**[5M]**
	b)	Convert the following Infix into Postfix expression: A+(B*C)/D.	[L4,CO3]	**[5M]**
5.		List the various operations that can be performed on stack? Explain with suitable example.	[L2,CO3]	**[10M]**
6.	a)	What do you mean by stack overflow and stack underflow?	[L4,CO3]	**[5M]**
	b)	List and explain the applications of stack.	[L3,CO3]	**[5M]**
7.		Discuss the use of stacks in backtracking algorithms, citing a problem like N-Queens or maze solving.	[L4,CO3]	**[10M]**
8.		Explain how stacks are used in expression evaluation, specifically in converting infix to postfix notation. Provide an example.	[L2,CO3]	**[10M]**
9.		Investigate how stacks are used in backtracking algorithms. Give an example of a problem that can be solved using backtracking and explain how a stack helps in finding the solution.	[L2,CO3]	**[10M]**
10.		Describe how stacks can be made using arrays and linked lists. Explain how to add (push) and remove (pop) items from each type of stack. Discuss the benefits and drawbacks of using arrays versus linked lists for implementing stacks.	[L5,CO3]	**[10M]**
11.		Detail a stack-based algorithm for reversing a singly linked list. Analyze its time and space complexity.	[L5, CO3]	**[10M]**

UNIT-IV
QUEUES AND DEQUES

1.	**a)**	Define queue.	**[L1,CO4]**	**[2M]**
	b)	Define priority queue.	**[L1,CO4]**	**[2M]**
	c)	List the applications of queues.	**[L1,CO5]**	**[2M]**
	d)	What is Deque?	**[L1,CO4]**	**[2M]**
	e)	What are the different types of queues?	**[L1,CO4]**	**[2M]**
2.	**a)**	Describe the properties of queues.	**[L2,CO4]**	**[5M]**
	b)	Illustrate the operations on queues.	**[L2,CO4]**	**[5M]**
3.		Describe the implementation of queues using arrays.	**[L2,CO4]**	**[10M]**
4.		Represent the implementation of queues using linked lists.	**[L2,CO5]**	**[10M]**
5.		Discuss the applications of queues in breadth first search.	**[L2,CO4]**	**[10M]**
6.	**a)**	Explain about scheduling.	**[L2,CO4]**	**[5M]**
	b)	Discuss about Deques.	**[L2,CO4]**	**[5M]**
7.	**a)**	What are the operations on Deques?	**[L1,CO4]**	**[5M]**
	b)	Explain the applications of Deques.	**[L2,CO5]**	**[5M]**
8.	**a)**	Define queue. Discuss about queue ADT.	**[L1,CO5]**	**[5M]**
	b)	Discuss about implementation of queues.	**[L2,CO4]**	**[5M]**
9.		Explain about double ended queue in detail.	**[L2,CO4]**	**[10M]**
10.		Define queue. Explain Types of queues.	**[L2,CO4]**	**[10M]**
11.		Develop a program to simulate a simple printer queue system.	**[L6,CO5]**	**[10M]**

UNIT-V
TREES & GRAPHS

1.	a)	Define trees in data structure	[L1,CO5]	[2M]
	b)	What is Binary search tree?	[L1,CO5]	[2M]
	c)	Define Graph.	[L1,CO5]	[2M]
	d)	List out types of Graph.	[L1,CO5]	[2M]
	e)	Give any Two Applications of Graph.		[2M]
2.	a)	Explain the Representation of Trees in data structure.	[L2,CO5]	[5M]
	b)	Define Trees and explain types of trees with example.	[L1,CO5]	[5M]
3.	a)	Create a Binary search Tree for the following values 45, 15, 79, 90, 10, 55, 12, 20, 50	[L3,CO5]	[5M]
	b)	Write the deletion operation of Binary search tree and delete the node 55 in the above created Tree.	[L3,CO5]	[5M]
4.		Examine the operations of binary search trees.	[L3,CO5]	[10M]
5.	a)	Classify BST traversals for inorder, preorder and post order.	[L4,CO5]	[5M]
	b)	Explain BST traversals.	[L2,CO5]	[5M]
6.	a)	Create a C program for traversing BST.	[L6,CO5]	[5M]
	b)	Create a Binary search Tree for the following values 45, 15, 79, 90, 10, 55, 12, 20, 50 and perform Binary search Tree (BST) Traversals.	[L6,CO5]	[5M]
7.	a)	Examine Operations of AVL Tree.	[L3,CO5]	[5M]
	b)	Examine Rotations of AVL Tree.	[L3,CO5]	[5M]
8.	a)	Define Graph and Explain Representation of Graph.	[L2,CO5]	[5M]
	b)	Explain Types of Graph.	[L2,CO6]	[5M]
9.		Explain Breadth First Traversal with Example.	[L2,CO6]	[10M]
10.		Explain Depth First Traversal with example.	[L2,CO6]	[10M]
11.	a)	Summarize the following types of graphs: A) Directed Graph B) Undirected Graph C) Mixed Graph	[L2,CO6]	[5M]
	b)	Summarize the following: A) Adjacency Matrix B) Adjacency List	[L2,CO6]	[5M]