Subject: Data Structure (C0510)   Branch: CSE

Name of the Faculty: N.PAPARAO

S N O.	Questions	Marks	BT Level	CO
	Module-I			
1	Classify the differences between Arrays and linked list?.	5	L2	1
2	Discuss the types and functions of ADT?	5	L2	1
3	Explain array and linked list representation of stack in detail?.	5	L2	1
4	Write a program for inserting a node into the linked list at beginning, end and random position	5	L1	1
5	Write a program for deleting a node from the linked list at beginning, end and random position	5	L1	1
6	Write about stack operations and applications in detail?	5	L1	1
7	Elaborate briefly array representation of Queues with example?	5	L2	1
8	Explain briefly list representation of Queues with example?	5	L2	1

S N O.	Questions	Marks	BT Level	CO
	Module-II			
1	Describe linear list and its operations?	5	L2	2
2	Explain skip list and its representation in detail?	5	L2	2
3	Classify Hash function and its types?	5	L3	2
4	Demonstrate Collision resolution techniques?	5	L3	2
5	Give the differences between Linear and Quadratic probing?	5	L2	2
6	Discuss Double hashing technique?	5	L2	2
7	Illustrate Rehashing with its advantages and disadvantages?	5	L3	2
8	Summarize a short notes on Extendible hashing?	5	L2	2

S NO.	Questions	Marks	BT Level	CO
	Module-III			
1	Determine what is tree and explain Tree terminology?	5	L3	3
2	Explain Binary Search trees with example? List the types of Binary Trees?	5	L4	3
3	Illustrate sequential and linked representation of Binary trees?	5	L3	3
4	Examine the ways of Traversing a Binary tree?	5	L4	3

Prepared By Name: N, PAPARAO

Signature: **HOD Signature**

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)
II B.Tech I Semester(MR 22) I Mid Question Bank 2023-24 (Objective)

Subject: Data Structures (C0510)　　　　　　　　**Branch: CSE**

Name of the Faculty: N, PAPARAO

S. NO.	Questions	Ans
	Module-I	
1.	Which of the following information is stored in a doubly-linked list's nodes? a) Value of node b) Address of next node c) Address of the previous node d) All of the above	d
2.	What is the optimal time complexity to count the number of nodes in a linked list? a)O(n) b)O(1) c)O(log n) d)None of the above	a

3.	How do you initialize an array in C?
	a) int arr[3] = (1,2,3);
	b) int arr(3) = {1,2,3};
	c) int arr[3] = {1,2,3};
	d) int arr(3) = (1,2,3);
		C

4.	Which of the following are applications of linked lists? a)Implementing file systems b)Chaining in hash tables c)Binary Trees implementation d)All of the above	D
5.	Insertion of an element at the middle of a linked list requires the modification of how many pointers? a)2 b)1 c)3 d)4	A
6.	Insertion of an element at the ends of a linked list requires the modification of how many pointers? a)2 b)1 c)3 d)4	B
7.	Which of the following can be done with LinkedList? a)Implementation of Stacks and Queues. b)Implementation of Binary Trees. c)Implementation of Data Structures that can simulate Dynamic Arrays. d)All of the above.	D
8.	A linked list node can be implemented using?	A

	a)Struct b)Class c)Both A and B d)None of the above	
9.	Which type of linked list stores the address of the head node in the next pointer of the last node? a)Singly Linked List b)Doubly Linked List c)Hashed List d)Circular Linked List	D
10.	Polynomial addition can be implemented using which of the following datastructure? a)Linked List b)Trees c)Stacks d)one of the above	A
11.	In which type of linked lists traversals can be performed in both directions? a)Singly Linked Lists b)Doubly Linked Lists c)Circular Linked Lists d)None of the above	B
12.	Which of the following is a nonlinear data structure a) Trees b) Stacks c) Queues d) None	A
13.	Which of the following algorithm is the optimal way to find the middle element of the linked list? a)Find length, and then traverse to length / 2 th node. b)Fast and slow pointer method c)Find distance of all nodes, and print middle nodes. d)None of the above	B
14.	A linked list in which none of the nodes contains a NULL pointer is? a)Singly Linked List b)Doubly Linked List c)Circular Linked List d)None of the above	C
15	Which of the following sorting algorithms can be applied to linked lists? a)Merge Sort b)Insertion Sort c)Quick Sort d)All of the above	D
16	Process of inserting an element in stack is called _____ a) Create b) Push c) Evaluation d) Pop	B
17	The type of pointer used to point to the address of the next element in a linked list? a)Pointer to character b)Pointer to integer c)Pointer to node d)None of the above	C

18	Which of the following is optimal to find an element at kth position at the linked list? a)Singly Linked List b)Doubly Linked List c)Circular Linked List d)Array implementation of linked list.	D
19	Assuming int is of 4bytes, what is the size of int arr[15];? a) 15 b) 19 c) 11 d) 60	d
20	Which of the following problems can be solved using 2 pointers on linked list? a)Detecting cycle in a linked list b)Finding intersection of 2 linked lists c)Finding middle element of a linked list d)All of the above	D
21	If the elements '1', '2', '3' and '4' are added in a stack, so what would be the order for the removal? a. 1234 b. 2134 c. **4321** **d.** None of the above	c
22	Which data structure is used in a compiler for managing information about variables and their attributes? a)Abstract Syntax Tree b)Symbol Table c)Semantic Stack d)Parse Table	B
23	Polynomial addition is implemented using which data structure? a)Queue b)Linked List c)Trees d)Stack	B
24	In a circular linked list insertion of a record requires the modification of? a)1 pointer b)2 pointer c)3 pointer d)4 pointer	B

25	Consider the following code snippet:
	struct node
	{
	int data;
	struct node * next;
	}
	typedef struct node NODE;
	NODE *ptr;
	How can we create a new node?
	a)ptr=(NODE*)malloc(sizeof(NODE));
	b)ptr=(NODE*)malloc(NODE);
		A

	c)ptr=(NODE*)malloc(sizeof(NODE*)); d)ptr=(NODE)malloc(sizeof(NODE));	
26	Which of the following statements are true? a)delete is a keyword. b)free is a library function. c)Both A and B d)None of the above	C
27	Which of the following statements are true? a)Random access of elements at a linked list is not possible. b)Arrays have better cache locality than linked list. c)The size of linked list is dynamic and can be changed as needed. d)All of the above	d
28	Which of these best describes an array? a) A data structure that shows a hierarchical behavior b) Container of objects of similar types c) Arrays are immutable once initialised d) Array is not a data structure	a
29	LIFO is the concept of ---data structure a) Queues b) Stacks c) Trees d) Graphs	b
30	The necessary condition to be checked before deletion from the Queue is__ a. Overflow b. Underflow c. Rear value d. Front value	b
31	Which data structure can be used to test a palindrome? a) Tree b) Heap c) Stack d) Priority queue	c
32	Elements in an array are accessed _____ a) randomly b) sequentially c) exponentially d) logarithmically	b
33	A linear list of elements in which deletion can be done from one end (front) and insertion can take place only at the other end (rear) is known as _____ a) Queue b) Stack c) Tree d) Linked list	a
34	A linear collection of data elements where the linear node is given by means of pointer is called? a) Linked list b) Node list c) Primitive list d) Unordered list	a

35	Linked list is considered as an example of _____ type of memory allocation. a) Dynamic b) Static c) Compile time d) Heap	a
36	Which of following is/are true regarding linked list data structure compared to Arrays a)arrays have better cache locality that can make them better in terms of performance b)It is easy to insert and delete element in linked list c)Random access is not allowed in typical implementation of linked list d) All of above	d

37	Which data structure is needed to convert infix notation to postfix notation
	   a) Stack
	   b) Queue
	   c) Trees
	   d) Linked list
		a

38	What differentiates a circular linked list from a normal linked list? a) You cannot have the 'next' pointer point to null in a circular linked list b) It is faster to traverse the circular linked list c) You may or may not have the 'next' pointer point to null in a circular linked list d) Head node is known in circular linked list	c
39	Which of the following application makes use of a circular linked list? a) Undo operation in a text editor b) Recursive function calls c) Allocating CPU to resources d) Implement Hash Tables	c
40	The optimal data structure used to solve Tower of Hanoi is _____ a) Tree b) Heap c) Priority queue d) Stack	d
41	What is the value of the postfix expression 6 3 2 4 + − *? a) 1 b) 40 c) 74 **d) -18**	d
42	Which of the following is false about a doubly linked list? a) We can navigate in both the directions b) It requires more space than a singly linked list c) The insertion and deletion of a node take a bit longer d) Implementing a doubly linked list is easier than singly linked list	d
43	If the elements '1', '2', '3' and '4' are inserted in a queue, what would be order for the removal? a. **1234** b. 4321 c. 3241 d. None of the above	a
44	Which of the following is not the type of queue? a)Priority queue b)Single-ended queue c)Circular queue d)Ordinary queue	b
45	What is the number of moves required to solve Tower of Hanoi problem for k disks? a) 2k − 1 b) 2k + 1	d

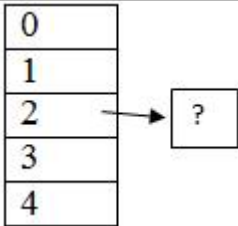|			
		c) $2^k + 1$ d) **$2^k - 1$**	
46	What is the disadvantage of array data structure? a)The amount of memory to be allocated should be known beforehand. b)Elements of an array can be accessed in constant time. c)Elements are stored in contiguous memory blocks. d)Multiple other data structures can be implemented using arrays.		a
47	Which one of the following is an application of queue data structure a)When a resource is shared among multiple consumers. b)When data is transferred asynchronously c)Load Balancing d)All of the above		d
48	Which of the following data structures finds its use in recursion? a)Stack b)Arrays c)LinkedList d)Queues		**a**
49	An ADT is defined to be a mathematical model of a user-defined type along with the collection of all _____ operations on that model a)Cardinality b)Assignment c)Primitive d)Structured		c
50	Which of the following is the infix expression? a)A+B*C b)+A*BC c)ABC+* d)None of the above		A
	Module -2		
51	--- Is a technique of mapping keys and values in to hash table a) Mapping b) Collision c) Indexing d) Hashing		d
52	--- is a data structure which is used for storing and accessing data very quickly a) Hash table b) Trees c) Graphs d) Probing		a
53	---- is a situation in which hash function has to written same hash key for more than one record a) Overflow b) Collision c) Underflow d) Hashing		b
54	Which of the following is not a type of collision resolution technique a) Chaining b) Linear probing c) Quadratic probing d)Hashing		d

55	In ---- Hashing we use two hash functions a) Quadratic probing b) Linear hashing c) Rehashing d)Double hashing	d
56	Which of the following points is/are true about Linked List data structure when it is compared with array a) Arrays have better cache locality that can make them better in terms of performance. b) It is easy to insert and delete elements in Linked List c) Random access is not allowed in a typical implementation of Linked Lists d) All of the above	
57	A linear collection of data elements where the linear node is given by means of pointer is called? a) Linked list b) Node list c) Primitive list d) None	a
58	Which of the following operations is performed more efficiently by doubly linked list than by singly linked list? a) Deleting a node whose location in given b) Searching of an unsorted list for a given item c) Inverting a node after the node with given location d) Traversing a list to process each node	a
59	Consider an implementation of unsorted singly linked list. Suppose it has its representation with a head and tail pointer. Given the representation, which of the following operation can be implemented in O(1) time? i) Insertion at the front of the linked list ii) Insertion at the end of the linked list iii) Deletion of the front node of the linked list iv) Deletion of the last node of the linked list a) I and II b) I and III c) I,II and III d) I,II and IV	c
60	In linked list each node contain minimum of two fields. One field is data field to store the data second field is? a) Pointer to character b) Pointer to integer c) Pointer to node d) Node	c
61	What would be the asymptotic time complexity to add a node at the end of singly linked list, if the pointer is initially pointing to the head of the list? a) O(1) b) O(n) c) θ (n) d) θ (1)	c

62	What would be the asymptotic time complexity to add an element in the linked list? a) O(1) b) O(n) c) O(n²) d) None	b
63	What is a hash table? a) A structure that maps values to keys b) A structure that maps keys to values c) A structure used for storage d) A structure used to implement stack and queue	b
64	If several elements are competing for the same bucket in the hash table, what is it called? a) Diffusion b) Replication c) Collision d) Duplication	c
65	What is direct addressing? a) Distinct array position for every possible key b) Fewer array positions than keys c) Fewer keys than array positions d) Same array position for all keys	a
66	What is the search complexity in direct addressing? a) O(n) b) O(logn) c) O(nlogn) d) O(1)	d
67	What is a hash function? a) A function has allocated memory to keys b) A function that computes the location of the key in the array c) A function that creates an array d) A function that computes the location of the values in the array	b
68	Which of the following is not a technique to avoid a collision? a) Make the hash function appear random b) Use the chaining method c) Use uniform hashing d) Increasing hash table size	d
69	What is the load factor? a) Average array size b) Average key size c) Average chain length d) Average hash table length	c
70	What is simple uniform hashing? a) Every element has equal probability of hashing into any of the slots b) A weighted probabilistic method is used to hash elements into the slots c) Elements has Random probability of hashing into array slots d) Elements are hashed based on priority	a
71	In simple uniform hashing, what is the search complexity? a) O(n) b) O(logn) c) O(nlogn) d) O(1)	d

72	In simple chaining, what data structure is appropriate? a) Singly linked list b) Doubly linked list c) Circular linked list d) Binary trees	b
73	What is the hash function used in Double Hashing? a) $(h1(k) - i*h2(k))\bmod m$ b) $h1(k) + h2(k)$ c) $(h1(k) + i*h2(k))\bmod m$ d) $(h1(k) + h2(k))\bmod m$	c
74	On what value does the probe sequence depend on? a) c1 b) k c) c2 d) m	b

75	What are the values of h1(k) and h2(k) in the hash function?
	a) $h1(k) = m \bmod k$
	    $h2(k) = 1+ (m' \bmod k)$
	b) $h1(k) = 1 + (m \bmod k)$
	    $h2(k) = m' \bmod k$
	c) $h1(k) = 1+ (k \bmod m)$
	    $h2(k) = k \bmod m$
	d) $h1(k) = k \bmod m$
	    $h2(k) = 1+ (k \bmod m')$
		d

76	What is the running time of double hashing? a) Theta(m) b) Theta(m^2) c) Theta(m log k) d) Theta(m^3)	a
77	Which technique has the greatest number of probe sequences? a) Linear probing b) Quadratic probing c) Double hashing d) Closed hashing	c
78	Which of the following schemes does quadratic probing come under? a) rehashing b) extended hashing c) separate chaining d) open addressing	d
79	What kind of deletion is implemented by hashing using open addressing? a) active deletion b) standard deletion c) lazy deletion d) no deletion	c
80	Which of the following is the correct function definition for quadratic probing? a) $F(i)=i^2$ b) $F(i)=i$ c) $F(i)=i+1$ d) $F(i)=i^2+1$	a

81	How many constraints are to be met to successfully implement quadratic probing? a) 1 b) 2 c) 3 d) 4	b
82	Which among the following is the best technique to handle collision? a) Quadratic probing b) Linear probing c) Double hashing d) Separate chaining	a
83	Which of the following techniques offer better cache performance? a) Quadratic probing b) Linear probing c) Double hashing d) Rehashing	b
84	What is the formula used in quadratic probing? a) Hash key = key mod table size b) Hash key=(hash(x)+F(i)) mod table size c) Hash key=(hash(x)+F(i^2)) mod table size d) H(x) = x mod 17	c
85	What is the load factor for an open addressing technique? a) 1 b) 0.5 c) 1.5 d) 0	b
86	How many probes are required on average for insertion and successful search? a) 4 and 10 b) 2 and 6 c) 2.5 and 1.5 d) 3.5 and 1.5	c
87	The elements of a linked list are stored a) In a structure b) In an array c) Anywhere the computer has space for them d) In contiguous memory locations	c
88	Which of the following is not a collision free resolution techniques in hash table using linear open addressing? a) Rehashing b) Clustering c) Linear Probing d) Quadratic probing	a
89	The case in which a key other than the desired one is kept at the identified location is called? a) Hashing b) Collision c) Chaining d) Open addressing	b
90	What data organization method is used in hash tables? a) Stack b) Array c) Linked list	c

	d) Queue	
91	The task of generating alternative indices for a node is called? a) Collision handling b) Collision detection c) Collision recovery d) Closed hashing	a
92	Which of the following is not a collision resolution technique? a) Separate chaining b) Linear probing c) Quadratic probing d) Hashing	d
93	In a hash table of size 10, where is element 7 placed? a) 6 b) 7 c) 17 d) 16	b
94	Which of the following operations are done in a hash table? a) Insert only b) Search only c) Insert and search d) Replace	c
95	Which of the following is identical to that of a separate chaining hash node? a) Linked list b) Array c) Stack d) Queue	a
96	Which of the following is the hashing function for separate chaining? a) H(x)=(hash(x)+f(i)) mod table size b) H(x)=hash(x)+i^2 mod table size c) H(x)=x mod table size d) H(x)=x mod (table size * 2)	c
97	What is the correct notation for a load factor? a) Ω b) ∞ c) $\sum$ d) λ	d
98	In hash tables, how many traversal of links does a successful search require? a) 1+λ b) 1+λ^2 c) 1+ (λ/2) d) λ^3	c
99	What is the worst case search time of a hashing using separate chaining algorithm? a) O(N log N) b) O(N) c) O(N^2) d) O(N^3)	b
100	From the given table, find '?'. Given: hash(x)= x mod 10	

	 a) 13 b) 16 c) 12 d) 14	c
	Module-III	
101	The number of edges from the root to the node is called _____ of the tree. a) Height b) Depth c) Length d)width	b
102	The number of edges from the node to the deepest leaf is called _____ of the tree. a) Height b) Depth c) Length d) Width	a
103	What is a full binary tree? a) Each node has exactly zero or two children b) Each node has exactly two children c) All the leaves are at the same level d) Each node has exactly one or two children	a
104	What is a complete binary tree? a) Each node has exactly zero or two children b) A binary tree, which is completely filled, with the possible exception of the bottom level, which is filled from right to left c) A binary tree, which is completely filled, with the possible exception of the bottom level, which is filled from left to right d) A tree In which all nodes have degree 2	c
105	Which of the following is not an advantage of trees? a) Hierarchical structure b) Faster search c) Router algorithms d) Undo/Redo operations in a notepad	d
106	In a full binary tree if number of internal nodes is I, then number of leaves L are? a) L = 2*I b) L = I + 1 c) L = I − 1 d) L = 2*I − 1	b
107	Which of the following is false about a binary search tree? a) The left child is always lesser than its parent b) The right child is always greater than its parent c) The left and right sub-trees should also be binary search trees d) In order sequence gives decreasing order of elements	d

108	What does the following piece of code do?	c

```
publicvoid func(Tree root)
{
        func(root.left());
        func(root.right());
        System.out.println(root.data());
}
```

a) Preorder traversal
b) Inorder traversal
c) Postorder traversal
d) Level order traversal

109	The difference between the external path length and the internal path length of a binary tree with n internal nodes is a)1 b)n c)2n d)n+1	c
110	Suppose a binary tree is constructed with n nodes, such that each node has exactly either zero or two children. The maximum height of the tree will be a) (n+1)/2 b) (n-1)/2 c) n/2 -1 d) (n+1)/2 -1	b
111	Which of the following statement about binary tree is CORRECT? a)Every binary tree is either complete or full b) Every complete binary tree is also a full binary tree c) Every full binary tree is also a complete binary tree d) A binary tree cannot be both complete and full	c
112	If a node having two children is to be deleted from binary search tree, it is replaced by its a) In-order predecessor b) In-order successor c) Pre-order predecessor d)none	b
113	In a full binary tree, every internal node has exactly two children. A full binary tree with 2n+1 nodes contains a)n leaf node b) n internal nodes c) n-1 leaf nodes d) n-1 internal nodes	b
114	The post order traversal of binary tree is DEBFCA. Find out the pre order traversal a)ABFCDEB. b)ADBFECC .c) ABDECFD. d)ABDCEF	C

115	The in-order traversal of tree will yield a sorted listing of elements of tree in a)binary trees b) binary search trees c) heaps d) binary heaps	b
116	In a binary tree, certain null entries are replaced by special pointers which point to nodes higher in the tree for efficiency. These special pointers are called .... a) Leaf b) Branch c). Path d). Thread	d
117	What will be the post order traversal of a binary Tree T, if preorder and inorder traversals of a T are given by ABCDEF and BADCFE respectively? a)BEFDCA b)BFDECA c)BCFDEA d) **BDFECA**	d
118	Which one of the following is false about a binary search tree? a)The left child is always lesser than its parent b)The right child is always greater than its parent c)The left and right sub-trees should also be binary search trees **d)In order sequence gives decreasing order of elements**	d
119	In delete operation of BST, we need inorder successor (or predecessor) of a node when the node to be deleted has both left and right child as non-empty. Which of the following is true about inorder successor needed in delete operation? a)Inorder Successor is always a leaf node **b)Inorder successor is always either a leaf node or a node with empty left** c)Inorder successor may be an ancestor of the node d)Inorder successor is always either a leaf node or a node with empty right	b
120	Which of the following traversal outputs the data in sorted order in a BST? a)Inorder **b)preorder** c)Postorder d)Level order	b
121	The number of edges from the root to the node is called _____ of the tree. a) Height b) **Depth** c) Length d) Width	b
122	The number of edges from the node to the deepest leaf is called _____ of the tree. a) **Height** b) Depth c) Length d) Width	a
123	What is a full binary tree? a) **Each node has exactly zero or two children** b) Each node has exactly two children c) All the leaves are at the same level d) Each node has exactly one or two children	a

124	How many edges are present in path cluster? a) **2** b) 3 c) 6 d) 1	a
125	For how many vertices in a set, is top tree defined for underlying tree? a) 3 b) 4 c) 5 d) **2**	d

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Signature: **HOD Signature**