

BRAINWARE UNIVERSITY

Term End Examination 2019 - 20

Programme - Bachelor of Technology in Computer Science & Engineering

Course Name – Data structure and Algorithms

Course Code – PCC-CS301

(Semester - 3)

Time allotted: 3 Hours Full Marks: 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group -A (Multiple Choice Type Question) $20 \times 1 = 20$ 1. Choose the correct alternative from the following (Answer any Twenty) (i) Finding the location of a given item in a collection of items is called a. Discovering b. Finding c. Searching d. Mining What is the worst case time complexity of linear search algorithm? (ii) a. O(1) b. O(logn) c. O(n)d. None of these (iii) Arrays are best data structures for relatively permanent b. for the size of the structure and the data collections of data in the structure are constantly changing c. for both of above situation d. for none of above situation (iv) If the array is already sorted, which of these algorithms will exhibit the best performance a. Merge sort b. Insertion sort c. quicksort d. heap sort What is the postfix expression for the corresponding infix expression? (v) a+b*c a. ab+c* b. abc+* d. abc*+ c. a+bc*

(vi)	What should be the value of rear (end) if the queue is full (elements are completely occupied)					
	a.	1	b.	-1		
	c.	MAX + 1	d.	MAX - 1		
(vii)	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		
(viii)	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.	Pointer to float		
(ix)	Which value is assigned/set at front and rear ends during the Initialization of a Queue?					
	a.	0	b.	-1		
	c.	1	d.	infinity		
(x)	is a step by step procedure for calculation.					
	a.	program	b.	Algorithm		
	c.	Greedy method	d.	problem		
(xi)	Evaluate the postfix expression 3574-2^*+					
	a.	41	b.	45		
	c.	48	d.	50		
(xii)	What is the method to represent a two dimensional array in memory?					
	a.	Row major order	b.	Column major order		
	c.	Both a and b	d.	FIFO		
(xiii)		ry search tree whose left subtree a called	nd r	ight subtree differ in hight by at most 1		
	a.	AVL tree	b.	Red-black tree		
	c.	Lemma tree	d.	None of the above		
(xiv)	In list.	, search start at the beginn	ning	of the list and check every element in the		
	a.	Linear search	b.	Binary search		
	c.	Hash Search	d.	Binary Tree search		
(xv)	When new data are to be inserted into a data structure, but there is not available space; this situation is usually called					
	a.	Underflow	b.	overflow		
	c.	houseful	d.	saturated		
(xvi)	The data structure which is one ended is					
	a.	queue	b.	stack		
	c.	tree	d.	graph		

(xvii)	The complexity of Bubble sort algorithm is					
, ,		O(n)		O(log n)		
	C.	$O(n^2)$	d.	O(n log n)		
(xviii)	In C, what are the basic loops required to perform an insertion sort?					
(11 / 111)	a.	1 1 1 1	-	if else		
	c.	for and while	d.	for and if		
(xix)	The given array is $arr = \{3,4,5,2,1\}$. The number of iterations in bubble sort is,					
	a.	•	b.			
	c.	2	d.	1		
(xx)	Process of removing an element from stack is called					
	a.	Create	b.	Push		
	c.	Evaluation	d.	Pop		
(xxi)	Which data structure is needed to convert infix notation to postfix notation?					
	a.	Branch	b.	Tree		
	c.	Queue	d.	Stack		
(xxii)	Which of the following is true?					
	a.	A graph may contain many	b.	A graph must contain at least one		
	0	edges and no vertices	d	vertex. None of these		
	c.	A graph may contain no edges and no vertices	u.	None of these		
(xxiii)	Extended tree is also called					
	a.	2 -Tree	b.	3 -Tree		
	c.	4 -Tree	d.	5 -Tree		
(xxiv)	The pointer variable head or start in linked list stores the address of the					
	a.	First Node	b.	Last Node		
	c.	Both a and b	d.	None of these		
(xxv)	Which among the following belongs to the category of an In-Order Traversal?					
		Root -> Left Sub Tree -> ght Sub Tree	b.	Right Sub Tree -> Left Sub Tree -> Root		
		Root -> Right Sub Tree ->	d.	Right Sub Tree -> Left Sub Tree -> Root		

	Group – B				
	(Short Answer Type Questions)	4 x 5 = 20			
Ans	wer any four from the following				
2.	Write an algorithm to perform PUSH and POP operation. Explain the algorith with suitable examples.				
3.	3. Suppose the following six numbers are inserted in order into an empty binary search tree T: 50, 77, 30, 66, 40, 33. Draw the tree T by describing each step of insertion.				
4.	Write down the algorithm of BFS technique.	5			
5.	Explain Division method in Hashing.	5			
6.	Define Algorithm. State the characteristics of an algorithm	2+3			
7.	Explain Binary Search Tree with an example.	5			
	Group – C				
(Long Answer Type Questions)					

Ans	wer a	ny three from the following	
8.	(a)	Translate the following infix expression into its equivalent postfix expression: $A + B * D - E + F$.	5
	(b)	What is the difference between Stack and Queue Data Structure?	5
9.		Construct the AVL tree for a calendar where nodes are entering in the following order-MARCH, MAY, NOVEMBER, AUGUST, APRIL, JANUARY, DECEMBER, JULY, FEBRUARY, JUNE, OCTOBER AND SEPTEMBER.	10
10.	(a)	White down the advantages of Circular List over Singly Linked List.	5
	(b)	Write an algorithm to delete a node from the last position of a singly linked list.	5
11.	(a)	Compare single, Double and Circular Linked List with logical structure.	5
	(b)	When a stack can be considered as empty?	5
12.		Write short notes:	
	(a)	Algorithm: Complexity	5
	(b)	B Tree	5