

BRAINWARE UNIVERSITY

Term End Examination 2018 - 19

Programme – Master of Computer Applications

Course Name - Data Structure with Python

Course Code - MCA202

(Semester - 2)

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) $10 \times 1 = 10$ Choose the correct alternative from the following 1. The time complexity of the following program code is-(i) while (n!=1): n=n/2b. O(logn) a. O(n)d. $O(n^2)$ c. O(nlogn) (ii) A vertex that has no child is called a. NULL vertex b. None Vertex d. none of these c. pendant vertex (iii) Best case time complexity of insertion sort is a. O(1) b. O(n)d. $O(n^2)$ c. O(nlogn) (iv) We can implement a queue data structure using stack data structure. In that case we need at least a. one stack b. two stack c. three stack d. cannot be implemented The time complexity of T(n) = T(n/2) + 1(v) a. O(logn) b. O(n)c. O(1) d. O(nlogn)

(vi)	(vi) The time complexity of the following program code is for i in range(n): for j in range(n): if j==2:								
		break							
	a.	O(1)	b.		O(n)				
	c.	$O(n^2)$	d.		O(logn)				
(vii)	Which of the following searching techniques require the data to be in sorted form								
	a.	binary search	b.		linear search				
	c.	hashing	d.		none of these				
(viii)	viii) In the deletion operation of max heap, the root is replaced by								
	a.	next available valu sub-tree	ue in the left b.		next available value in the right subtree)-			
	c.	any random value heap	from the d.	•	last element at the last level				
(ix)	•								
	a.	Find the ith larges	t element b.	•	Delete an element				
	c.	Find the ith smalle	est element d.	•	All of the above				
(x)	x) Which of the following sorting technique is not stable sort?								
	a.	Bubble sort	b.		Insertion sort				
	c.	Merge sort	d.		Quick sort				
			Group – B	3					
			(Short Answer Type	e (Questions) $3 \times 5 =$: 15			
Ansv	ver any <i>th</i>	aree from the follow	ving						
2.									
	Inorder : DBFEAGCLJHK Postorder : DFEBGLJKHCA								
3.	Find the time complexity of $T(n) = T(n-1) + n$								
4.	What is abstract data type? Write PUSH and POP algorithm of a stack using 1+4 array data structure.								
_									
5.	Convert the following infix expression into its equivalent postfix expression. 5 (a+b)*c-d/(e-f)*g-h								
6.	Write a python function to implement insertion sort algorithm 5								

Group-C

		(Long Answer Type Questions)	$3 \times 15 = 45$
Ans	wer a	ny three from the following	
7.	(a)	Show how the merge sort algorithm will sort the following list of eleme in ascending order: 100,90,80,70,60,50,40,30,20	ents 4
	(b)	Why does it run faster than bubble sort in most of the cases?	1
	(c)	Write an algorithm to implement merge sort algorithm. Analyse the ti complexity of your algorithm.	me 5+5
8.	(a)	What are the advantages and disadvantages of linked list over array?	3
	(b)	Write python functions to implement the following on a singly linked list (i) Insert an element at the end of the list (ii) Delete a particular element.	st: 5+5
	(c)	What are the advantages and disadvantages of linked list over array?	3
9.	(a)	Define hashing	3 2
	(b)	Explain three hashing methods with a suitable example.	6
	(c)	Explain with a suitable example the collision resolution scheme using linear probing with open addressing	5
	(d)	What is quadratic probing?	2
10.	(a)	Construct an AVL tree with the following list of elements Jan, Sun, Feb, Mon, Mar, Tue, Apr, Wed, May, Thu Jun, Fri	6
		Clearly mention different rotations and balance factor of each node	
	(b)	Sort the following list of elements using radix sort algorithm 345, 123,234,354,456,543,654,356,378,389,300,30,450,100	5
	(c)	Write a python function to reverse a singly linked list (i.e., the first node becomes the last node)	4
11.		Write short notes on any three of the following	3x5
	(a)	Collision resolution techniques in chaining	
	(b)	Tail recursion	
	(c)	Sequential representation of binary tree	
	(d)	Asymptotic Notation	
	(e)	Doubly linked list	
