Total No. of Questions: 6 *Total No. of Printed Pages:2*

Enrollment No.....

Faculty of Science

End Sem (Odd) Examination Dec-2017

BC3CO09 Data Structure

Programme: B.Sc.(CS) Branch/Specialisation: Computer Science

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. What is the worst case run-time complexity of binary search algorithm? **1**

(a) $O(n^2)$ (b) $O(n\log_2 n)$

(c) $O(n^3)$ (d) $O(\log_2 n)$

ii. Which of the following is non-linear data structure? **1**

(a) Stack (b) Queue (c) Tree (d) None of these

iii. What is the right way to initialize array in C language? **1**

(a) int [3] a = (1,2,3); (b) int a[3] = (1,2,3);

(c) int a() = {1,2,3}; (d) int a[3] = {1,2,3};

iv. Let X be an array, which operation is illegal in C language: **1**

(a) X++ (b) X*= 2 (c) X-=2 (d) All of these

v. Element inserted in a queue at – **1**

(a) Rear (b) Random (c) Front (d) Middle position

vi. Element inserted in a stack at – **1**

(a) Rear (b) Top (c) Bottom (d) Middle position

vii. A balance factor in AVL tree is used to check **1**

(a)What rotation to make.

(b) If all child nodes are at same level.

(c) When the last rotation occurred.

(d) If the tree is unbalanced.

viii. Linklist can be used to implement Queue: **1**

(a) True (b) False (c) Sometimes (d) None of these

ix. Exchange and partition sort is: **1**

(a) Quick Sort (b) Tree Sort (c) Heap Sort (d) Bubble Sort

P.T.O.

x. Finding the location of the given item in a collection of items is called: **1**

(a) Discovering (b) Searching

(c) Mining (d) None of these

Q.2 i. Describe the classification of Data Structure. **2**

ii. Explain different types of Data structure Operations. **3**

iii. What is the significance of complexity of algorithms? **5**

OR iv. Explain different notations of time complexity and their uses. **5**

Q.3 i. How single and multidimensional Arrays are declared and defined? **2**

ii. Explain address calculation of one dimensional and two dimensional arrays with the help of examples. **8**

OR iii. How array as parameters are passed? Explain with the help of examples. **8**

Q.4 i. What is a stack? What operations can be implemented on a stack? **3**

ii. Write a programme to implement stack with required functions. **7**

OR iii. Write a programme to implement queue with required functions. **7**

Q.5 i. What is a linked list? Explain its types also. **4**

ii. Write functions to insert element in a sorted linked list such that linked list remain sorted after insertion of new element. **6**

OR iii. Explain different types of Binary tree traversal with examples. **6**

Q.6 Attempt any two:

i. Explain the working of heap sort algorithm with the help of an example. **5**

ii. Explain the working of merge sort algorithm with the help of an example. **5**

iii. Write the difference between a tree and a graph. Also explain working of a Hash function. **5**

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Marking Scheme

Q.1	i.	(d) O($\log_2 n$)	**1**
	ii.	(c) Tree	**1**
	iii.	(d) int a[3] = {1,2,3};	**1**
	iv.	(d) All of these	**1**
	v.	(a) Rear	**1**
	vi.	(b) Top	**1**
	vii.	(d) If the tree is unbalanced.	**1**
	viii.	(a) True	**1**
	ix.	(a) Quick Sort	**1**
	x.	(b) Searching	**1**
Q.2	i.	Describe the classification of Data Structure.	**2**
	ii.	Explain different types of Data structure Operations.	**3**
	iii.	What is the significance of complexity of algorithms?	**5**
OR	iv.	Explain different notations of time complexity and their uses.	**5**
Q.3	i.	How single and multidimensional Arrays are declared and defined?	**2**
	ii.	Explain address calculation of one dimensional and two dimensional arrays with the help of examples. **(4+4)**	**8**
OR	iii.	How array as parameters are passed **(6)**? Explain with the help of examples **(2)**.	**8**
Q.4	i.	What is a stack **(1)**? What operations can be implemented on a stack **(2)**?	**3**
	ii.	Write a programme to implement stack with required functions.	**7**
OR	iii.	Write a programme to implement queue with required functions.	**7**
Q.5	i.	What is a linked list**(2)**? Explain its types also **(2)**.	**4**
	ii.	Write functions to insert element in a sorted linked list such that linked list remain sorted after insertion of new element.	**6**
OR	iii.	Explain different types of Binary tree traversal with examples.	**6**
Q.6		Attempt any two:	
	i.	Explain the working of heap sort algorithm with the help of an example.	**5**
	ii.	Explain the working of merge sort algorithm with the help of an example.	**5**
	iii.	Write the difference between a tree and a graph **(3)**. Also explain working of a Hash function **(2)**.	**5**

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