

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Special), January 2016
B. Tech. and B.Tech+MBA in Computer Science and Engineering, Semester III

Roll No.....

CSE301: DATA STRUCTURES

Time: 03 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

10

- i. The following steps are involved in Evaluating a Postfix expression.
 - (i) If token is a number, push it into the stack
 - (ii) Pop the answer of the stack
 - (iii) Else, if token is an operator, pop two tokens off the stack, apply the operator and push the answer back into the stack
 - (iv) Initialize an empty stack
 - (v) While tokens remain in the input stream
 - (vi) Read next tokenWhat is the correct order of the above steps for Evaluating a Postfix expression?
 - (a) (vi), (v), (i), (iv), (iii), (ii)
 - (b) (iv), (vi), (v), (i), (iii), (ii)
 - (c) (iv), (v), (vi), (i), (iii), (ii)
 - (d) (iv), (vi), (i), (iii), (iv), (ii)
 - (e) (iv), (vi), (i), (iii), (ii), (v)
- ii. $ABC + * CBA - + *$ is a postfix expression with the assumption $A = 1$, $B = 2$, and $C = 3$.
If the above postfix expression is evaluated, the final stack value is?
 - (a) 9
 - (b) 20
 - (c) 10
 - (d) 10, 20
 - (e) 6
- iii. Suppose we have a circular array implementation of the queue class, with ten items in the queue stored at data [2] through data[11]. The CAPACITY is 42. Where does the push member function place the new entry in the array?
 - a. data[1]
 - b. data[2]
 - c. data[11]
 - d. data[12]
- iv. Suppose u opened a notepad, a music player, an excel sheet, and also u are doing your data structure programming simultaneously. Your Windows-XP

	implements _____ data structure for it	
	a. tree	
	b. stack	
	c. linked list	
	d. QUEUE	
v.	In C language to implement the heterogeneous linked list _____ pointer is used.	
	a. Void	
	b. Null	
	c. Int	
	d. Structure	
vi.	A Binary Tree of height h, that contains exactly $2^h - 1$ is called a _____	
	a. B tree	
	b. complete binary tree	
	c. Fully Binary Tree	
	d. AVL tree	
vii.	Searching a linked list requires linked list be created	
	a. In sorted order only	
	b. In any order	
	c. Without under flow condition	
	d. None	
viii.	Of the following tree structure, which is efficient considering space and time complexities?	
	a. Incomplete Binary Tree	
	b. Binary Tree	
	c. Full Binary Tree	
	d. Complete Binary Tree	
ix.	In binary search tree which traversal is used for getting ascending order values _____.	
	a. Reverse order	
	b. Preorder	
	c. Post order	
	d. In order	
x.	which of the following statement is true	
	a. Root of the tree has a level 0	
	b. The level of any node is one more than the level of its parent	
	c. The depth of binary tree is the maximum level of any leaf in the tree	
	d. All the above	
Q.2	Short answer type questions (4 questions @ 2.5 marks)	10
i.	Evaluate the given postfix expression 12, 7, 3, -, /, 2, 1, 5, +, *, +,	
ii.	List two methods of handling collisions in a hash table?	
iii.	What are the two components of a hash function?	
iv.	There are 8, 15, 13, 14 nodes were there in 4 different trees. Which of them could have formed a full binary tree and why?	
Q.3A	what is the Prefix and postfix expression of the given Infix expression using stack : ((A+B*C)\$((A+B)*C)*D/E)	05
Q.3B	Perform the following sequence of operations in an initially empty splay tree	05

and draw the tree after each set of operations.

(a) Insert keys 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, in this order

(b) search 12

OR

Q.3B Explain the procedure of merge sort with some example also discuss its complexity?

05

Q.4A insert, into an empty binary search tree, entries with keys 30, 40, 24, 58, 48, 26, 11, 13, 76, 88, 99, 54, 29, 75 (in this order).

05

Also find it's preorder and post order.

Q.4B The following postfix expression S and the initial values of the variables are.

05

$S = A B - C + D E F - + ^$

Assume that $A=3, B=2, C=1, D=1, E=2, F=3$

f the above S is evaluated using a stack, what is/are the intermediate value(s) on the top of the stack? Also find its prefix expression?

OR

Q.4B What is the difference between a queue and a stack?

05

Q.5A The in order and post order traversals of a certain binary search tree are given as follows.

05

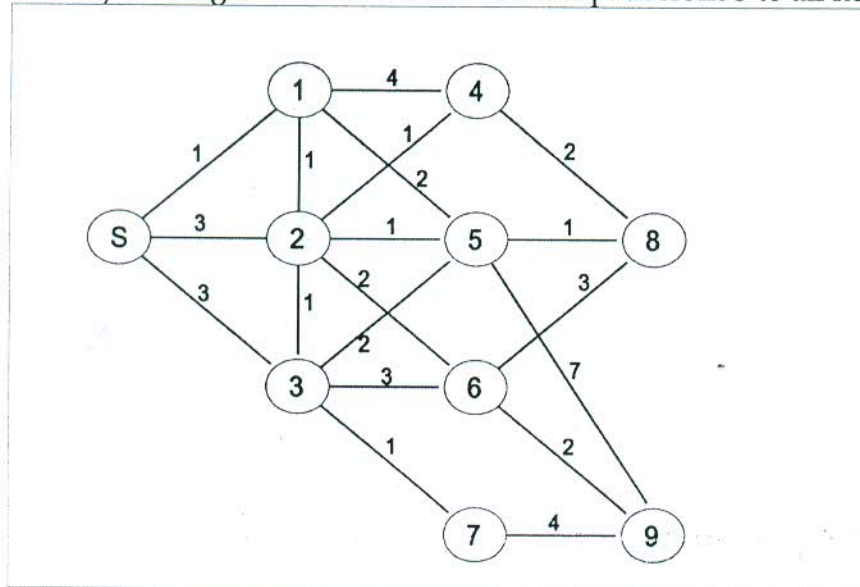
In order Traversal: 10,30,40,50,52,54,55,60,90

Post order Traversal: 40,54,52,55,50,30,60,90,10

Construct the binary search tree from above traversals and write the preorder traversal.

Q.5B Use Dijkstra algorithm to find the shortest path from S to all nodes.

05



OR

Q.5B Write an algorithm that computes the number and sum of elements in a linear linked list.

05

Q.6A Imagine that the following operations are performed on an initially empty splay tree:

05

Insert(1), Insert(10), Insert (5), Insert (3), Insert (7), Insert (13), Find (3).

Show the state of the splay tree after performing each of the above operations. Be sure to label each of your trees with what operations you have just completed.

Q.6B Draw the binary min heap that results from inserting: 77, 22, 9, 68, 16, 34, 13, 8 in that order into an initially empty binary min heap. 05

Q.7A Construct AVL search tree by inserting the following elements in the order of their occurrence. Show the balance factor and type of rotation at each step. 05

80, 66, 60, 65, 50, 84, 49, 68, 44, 66, 78, 79, 56, 99, 101, 105, 183, 205

Q.7B Sort the following numbers in descend using heap sort (Max Heap) 10

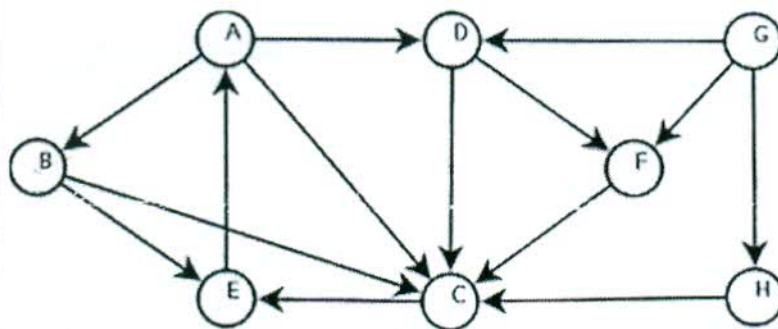
22, 75, 34, 55, 25, 10, 45, 52, 90, 65, 49, 82, 69, 58, 81, 46

OR

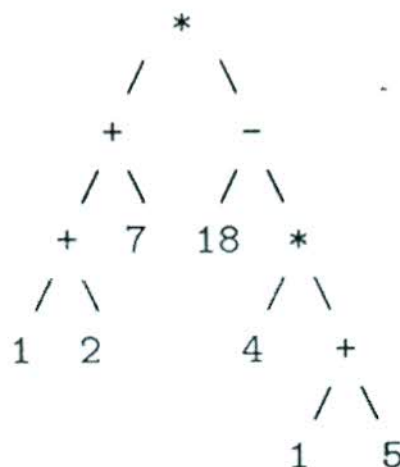
Q.7B Write an algorithm and program for Binary Search. Explain its best case, worst case & average case complexity with example. 10

Q.8A 05

Q.8B Perform BFS and DFS starting from the node a? 05



Q.9A find out the pre order traversal, post order traversal and in order traversal sequence of the given tree: 05



Q.9B Sort the given values using Quick Sort? 10

65, 70, 75, 80, 85, 60, 55, 50, 45