INSTITUTE OF AERONAUTICAL ENGINEERING

(AUTONOMOUS)

Dundigal, Hyderabad -500 043

INFORMATION TECHNOLOGY

ASSIGNMENT

Course Name	:	**DATA STRUCTURES**
Course Code	:	A30502
Class	:	II B. Tech I Semester
Branch	:	Information Technology
Year	:	2016 – 2017
Course Faculty	:	Mr CH Suresh Kumar Raju, Associate Professor

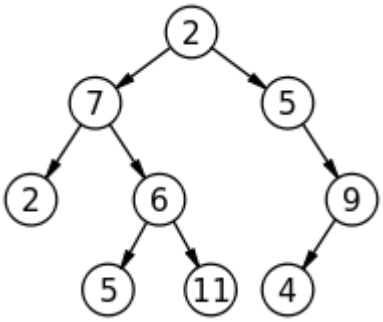
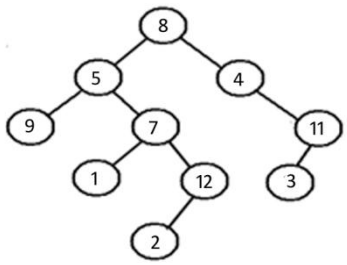
OBJECTIVES:

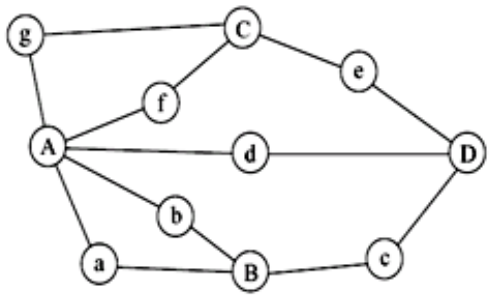
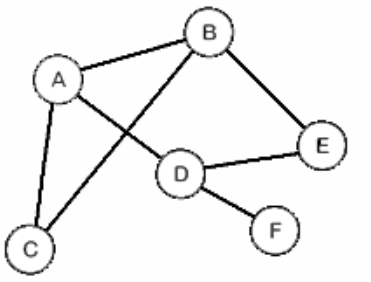
To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

ASSIGNMENT - I

S. No	Question	Blooms Taxonomy Level	Course Outcome
	UNIT – I		
1	Take $F(n)=5n^2+10n$, **Convert** this to Ω() notation	Apply	5
2	**Write** a C program that uses functions to perform the following: i. Create a singly linked list of integers. ii. Delete a given integer from the above linked list. iii. Display the contents of the above list after deletion.	Apply	7
3	**Write** a C program that uses functions to perform the following: i. Create a doubly linked list of integers. ii. Delete a given integer from the above doubly linked list. iii. Display the contents of the above list after deletion.	Apply	7
4	**Explain** array and linked representation of sparse matrix?	Understand	6
5	**Discuss** various the asymptotic notations used for best case average case and worst case analysis of algorithms?	Understand	5
6	**Explain** performance analysis in detail?	Understand	5

S. No	Question	Blooms Taxonomy Level	Course Outcome
7	F(n)=√n and g(n)=log n , **show** that f(n)+g(n)=O(√n)	Apply	5
8	**Write** an algorithm to insert and delete a key in a circular queue?	Remember	6
9	**Explain** Array and Linked representation of Sparse Matrix	Understand	6
10	F(n)=$5n^2$+10n convert this to Ω() notation	Apply	5
	UNIT - II		
1.	**Write** C programs to implement stack ADT using arrays?	Apply	7
2.	**Write** C programs to implement stack ADT using linked list?	Apply	7
3.	**Write** C programs to implement queue ADT using arrays?	Apply	7
4.	**Write** C programs to implement queue ADT using linked list?	Apply	7
5.	**Evaluate** the postfix expression 6 2 3 + - 3 8 2 / + * 2 $ 3 +	Apply	1
6.	**Evaluate** the postfix expression 1 2 + 3 * 6 + 2 3 + /	Apply	1
7.	**Write** an algorithm for basic operations on circular queue ?	Remember	6
8.	**Explain** DEQUEUE ADT and its operations	Remember	6
9.	**Convert** infix expression into its equivalent post fix expression A*(B+D)/E-F*(G+H/K)	Apply	1
10.	**Convert** the expression ((A + B) * C - (D - E) ^ (F + G)) into equivalent Postfix notation.	Apply	1
	UNIT - III		
1	**List** the advantages of priority queue? Explain the implementation of priority queue.?	Understand	6
2	**Write** inorder, preoreder, post order traversal of the following tree 	Apply	10
3	**Write** inorder, preoreder, post order traversal of the following tree? 	Apply	10
4	**Define** threaded binary tree? Explain the impact of such a representation on the tree traversal procedure?	Understand	6
5	**Given** inorder traversal of a binary tree is D, G, B, E, A, H, F, I, C and pre	Apply	6

S. No	Question	Blooms Taxonomy Level	Course Outcome
	order traversal is A, B, D, G, E, C, F, H, I. **Construct** binary tree for the given traversal sequence?		
6	**Given** In order traversal of a binary tree is E,A,C,K,F,H,D,B,G and pre order traversal is F,A,E,K,C,D,H,G,B find the post order traversal	Apply	6
7	**Illustrate** DFS and BFS traversals of following graph 	Apply	10
8	**Illustrate** BFS and DFS traversals of following graph 	Apply	10
9	**Explain** BFS graphs traversal algorithms with suitable example	Understand	10
10	**Explain** DFS graphs traversal algorithms with suitable example	Understand	10
	UNIT – IV		
1	**Write** C programs for implementing quick sort to arrange a list of integers in ascending order	Apply	8
2	**Write** C programs for implementing merge sort to arrange a list of integers in ascending order	Apply	8
3	**Explain** quick sort algorithm and simulate it for the following data 20, 35, 10, 16, 54, 21, 25	Apply	8
4	**Compare** different sorting techniques	Understand	8
5	**Apply** insertion sort on the following elements 3, 1, 4,7,5,9,2,6,5,10	Apply	8
6	**Apply** the selection sort on the following elements21,11,5,78,49, 54,72,88	Apply	8
7	**Explain** the heap sort algorithm by tracing the following elements stepwise 3, 5, 9, 7, 1, 4, 6, 8, 2	Apply	8
8	**Analyze** input (371, 323, 173, 199, 344, 679, 989) and hash function h(x) = x mod 10, Show the result using quadratic probing, and double hashing **$h_2(x)$ =7 - (x mod 7).**	Apply	9
9	**Apply** quadratic hashing to fill the hash table of size 11 elements 20,5,10,22,33,40,50,30,51,31	Apply	9

S. No	Question	Blooms Taxonomy Level	Course Outcome
10	**Show** the each step of hash table entries for the given data set using linear probing 12,45,67,88,27,78,20,62,36,55 (size=10)	Apply	9
	UNIT - V		
1	**Write** a C program that uses functions to perform the following: a) Create a binary search tree of characters. b) Traverse the above Binary search tree recursively in Postorder.	Apply	7
2	**Give** an algorithm for constructing a binary search tree. While constructing the tree, take care that duplicate values are not added. Trace the algorithm on 2 ,5 , 9, 6, 12, 10, 13, 8	Apply	6
3	Insert the following elements into an empty AVL Tree 20,15,5,10,12,17,25,19	Apply	6
4	**Construct** a B-tree of order 3 with the following elements 10,20,15,3,2,16,21,25,30,40	Apply	6
5	**Construct** a B-tree of order 7 with the following elements 4,40,23,50,11,34,62,78,66,22,90,59,25,72,64,77,39,12	Apply	6
6	**Write** a C program that uses functions to perform the following: a) Create a binary search tree of integers. b) Traverse the above Binary search tree non recursively in inorder.	Apply	6
7	**Write** a C program for implementing Knuth-Morris- Pratt pattern matching algorithm to determine the index of the string S1 of length m in string S2 of length n where m<n	Apply	6
8	**Apply** KMP algorithm on pattern “abacab” and text “abacaabaccabacabaabb”	Apply	6
9	**Describe** the insertion, searching operations on B-Trees	Understand	6
10	**Explain** various rotations of AVL Trees maintaining balance factor while insertion takes place.	Understand	6

Prepared By: Mr Ch. Suresh Kumar Raju, Associate Professor

HOD, IT