Hall Ticket No | | | | | | | | | | | Question Paper Code: BCSB02

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER

M.Tech I Semester End Examinations, January- 2020

Regulations: IARE - R18

ADVANCE DATA STRUCTURES

(CSE)

Time: 3 hours **Max. Marks: 70**

Answer ONE Question from each
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT– I

1.	a)	Explain about the implementation of stack operations using linked lists.	**[7M]**
	b)	What is a linked list. Specify the difference between singly, doubly and circular linked lists?	**[7M]**
2.	a)	Write the postfix form of each of the following infix expressions (a) A-B+(M$N) * (O+P)-Q/R"S*T+Z (b) K+L-M*N+(O "P)*W/U/V*T+Q	**[7M]**
	b)	Explain the concept of asymptotic notations and why do we use it? Explain different asymptotic notations.	**[7M]**

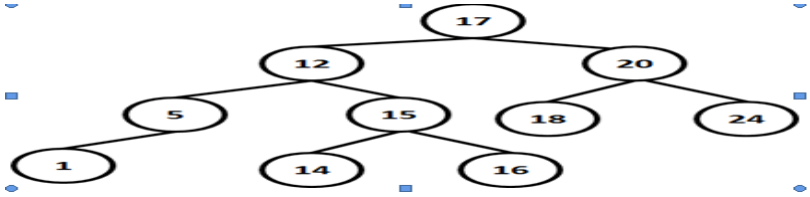
UNIT – II

3.	a)	How do you represent Hash Table? Explain.	**[7M]**
	b)	What do you mean by collision and how can you handle it by using linear probing?	**[7M]**
4.	a)	Define dictionary. Give the applications of dictionary with duplicates in which sequential access is desired.	**[7M]**
	b)	Explain how open hashing and closed hashing is done with examples.	**[7M]**

UNIT – III

5.	a)	Write an algorithm to implement Kruskal' s algorithrn. Also explain with the help of a suitable example.	**[7M]**
	b)	Construct tree from the given ignored and preorder traversals. Inorder : DBMINEAFCJGK Preorder : ABDEIMNCFGJK	**[7M]**

6. a) Apply BFS and DFS on the below graph **[7M]**



b) Explain adjacency matrix with the help of a suitable example. **[7M]**

UNIT – IV

7. a) What is a binary search tree (BST) and specify the steps showing the construction of a BST for the following data? **[7M]**
10, 08, 15, 12, 13, 07, 09, 17, 20, 18, 04, 05

b) What do you mean by a balance factor in AVL tree? Explain about LL and rotations with an example. **[7M]**

8. a) Explain the following : **[7M]**
(a) Binary Tree and Binary Search Tree
(b) Complete Binary Tree

b) Define search trees and discuss the differences between the various search trees and also give their comparisons. **[7M]**

UNIT – V

9. a) What is a splay tree? Explain in detail its operations and applications. **[7M]**

b) Write the advantages of splay tree in representation of dictionaries. **[7M]**

10. a) Elaborate the significance of Red-Black tree. **[7M]**

b) Explain rotations, insertion and deletion of red-black tree. **[7M]**

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COURSE OBJECTIVES:

The course should enable the students to:

I	Understand the data structures and techniques of algorithm analysis.
II	Solve problems using different data structures and compare their performance and tradeoffs.
III	Illustrate the implementation of linked data structures such as linked lists and binary trees.
IV	Understand graph algorithms such as shortest path and minimum spanning tree.
V	Learn advanced data structures such as balanced search trees, hash tables, priority queues

COURSE OUTCOMES (COs):

CO 1	Implementation of hash tables, including collision avoidance and resolution schemes.
CO 2	Analyze how to balance a binary search tree using rotation methods and color changing methods.
CO 3	Solve problems using graph algorithms, including single-source and all-pairs shortest paths, and minimum spanning tree algorithms.
CO 4	Relates all binary heap trees to form a large binomial queue for large data structures creation.
CO 5	Reconstructs such applications that take the advantage of a trie's ability to quickly search for, insert, and delete entries into the dictionary.

COURSE LEARNING OUTCOMES (CLOs):

BCSB02.01	Analyze time and space complexity of an algorithm for their performance analysis
BCSB02.02	Understand arrays, single and doubly linked lists in linear data structure and tress , graphs in non-linear data structure
BCSB02.03	Master a variety of advanced abstract data type (ADT) and their implementations
BCSB02.04	Understand dynamic data structures and relevant standard algorithms
BCSB02.05	Design and analyze and Concepts of heap, priority queue
BCSB02.06	Analyze probing methods like linear probing and quadratic probing
BCSB02.07	Understand and implement hash table and linear list representation
BCSB02.08	Understand the properties of binary tress and implement recursive and non-recursive traversals
BCSB02.09	Understand graphs terminology, representations and traversals in Graphs
BCSB02.10	Implement Depth First Search and Breath First Searching methods of non –linear data structures
BCSB02.11	Analyze dijkstra’s algorithm for single source shortest path problem for minimum cost spanning trees
BCSB02.12	Implement binary search ADT for finding parent node, smallest and largest values in binary search
BCSB02.13	Understand and implement operations and applications of red-Black and splay Trees
BCSB02.14	Implement Huffman Coding and decoding for text compression

MAPPING OF SEMESTER END EXAMINATION TO COURSE OUTCOMES

SEE Question No		Course Learning Outcomes		Course Outcomes	Blooms Taxonomy Level
1	a	BCSB02.01	Analyze time and space complexity of an algorithm for their performance analysis.	CO 1	Remember
	b	BCSB02.02	Understand arrays, single and doubly linked lists in linear data structure and tress, graphs in non-linear data structure.	CO 1	Understand
2	a	BCSB02.02	Understand arrays, single and doubly linked lists in linear data structure and tress, graphs in non-linear data structure.	CO 1	Remember
	b	BCSB02.02	Understand arrays, single and doubly linked lists in linear data structure and tress, graphs in non-linear data structure.	CO 1	Understand
3	a	BCSB02.03	Master a variety of advanced abstract data type (ADT) and their implementations.	CO 2	Understand
	b	BCSB02.03	Master a variety of advanced abstract data type (ADT) and their implementations.	CO 2	Understand
4	a	BCSB02.04	Understand dynamic data structures and relevant standard algorithms.	CO 2	Understand
	b	BCSB02.04	Understand dynamic data structures and relevant standard algorithms.	CO 2	Remember
5	a	BCSB02.05	Design and analyze and Concepts of heap, priority queue.	CO 3	Understand
	b	BCSB02.05	Design and analyze and Concepts of heap, priority queue.	CO 3	Remember
6	a	BCSB02.06	Analyze probing methods like linear probing and quadratic probing.	CO 3	Understand
	b	BCSB02.07	Understand and implement hash table and linear list representation.	CO 3	Remember
7	a	BCSB02.08	Understand the properties of binary tress and implement recursive and non-recursive traversals.	CO 4	Understand
	b	BCSB02.09	Understand graphs terminology, representations and traversals in Graphs.	CO 4	Understand
8	a	BCSB02.10	Implement Depth First Search and Breath First Searching methods of non –linear data structures.	CO 4	Remember
	b	BCSB02.11	Analyze dijkstra’s algorithm for single source shortest path problem for minimum cost spanning trees.	CO 4	Understand
9	a	BCSB03.12	Implement binary search ADT for finding parent node, smallest and largest values in binary search.	CO 5	Understand
	b	BCSB02.13	Understand and implement operations and applications of red-Black and splay Trees	CO 5	Remember
10	a	BCSB02.14	Implement Huffman Coding and decoding for text compression.	CO 5	Understand
	b	BCSB02.14	Implement Huffman Coding and decoding for text compression.	CO 5	Understand

Signature of Course Coordinator **HOD, CSE**