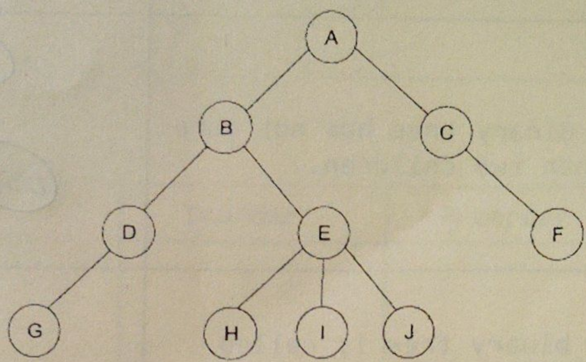
21CSC201J - DATA STRUCTURES AND ALGORITHMS

Unit-IV-Assignment

Reg. No. : RA2311026010677 Name : Namita Nahata

Year : 2024 Branch: CSE AI/ML Section: AA-2

I. Identify me:



Root	A	Parent of D	B
Leaf Nodes	G, H, I, J, F	Depth of J	3
Siblings of B	C	Height of B	2
Degree of E	2	Depth of tree	3
Path from A to J	A, B, E	Height of tree	3

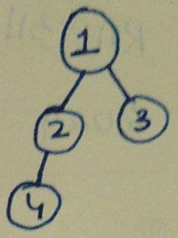
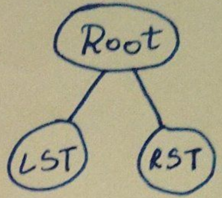
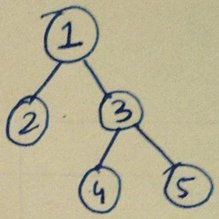
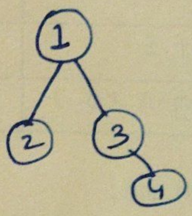
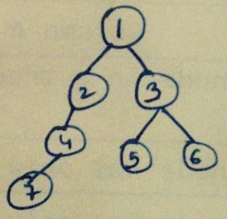
II. Match me:

Column A	Column B	
If every node in a tree has only one child.	Left skew tree	2
If every node has only left child.	Right skew tree	3
If every node has only right child.	Skew tree	1

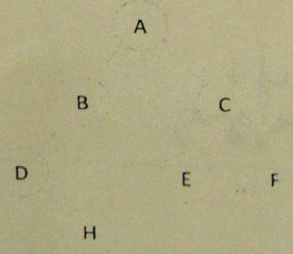
III. Declare me:

Binary Tree Node
struct Node{ int data; struct node* left; struct node* right;

IV. Draw me:

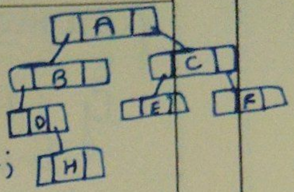
Concept	Description	Example
General tree	General tree has any number of children.	
Binary tree	A Binary tree has not more than two children.	
Strict binary tree	A binary tree is called strict binary tree if each node has exactly two children or no children.	
Complete binary tree	A complete binary tree of height h has between 2^h and 2^{h+1} - 1 nodes. In the bottom level the elements should be filled from left to right.	
Full binary tree (or) Perfect binary tree	A full binary tree of height h has 2^{h+1} - 1 nodes.	

V. Represent me:

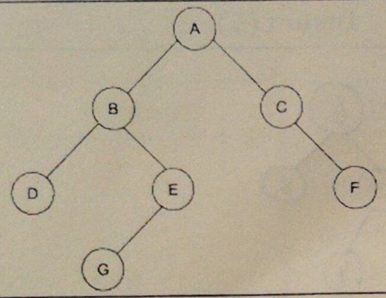
Tree	Linear
	| A | B | C | D | | E | F | | H |

VI. Represent me:

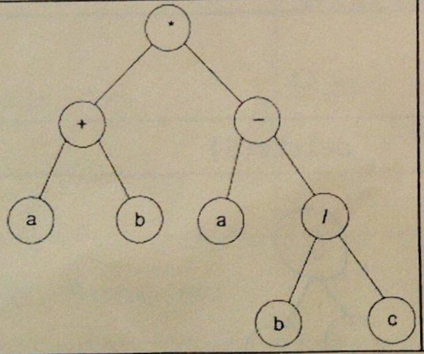
Tree	Linked

A
B C
D E F
H
	struct Node{
	char data;
	struct Node* left;
	struct Node* right;
	};
	

VII. Represent me:

Tree	Inorder	Preorder	Postorder
	~~DBEFAC~~ DBGEACF	~~ABDEFC~~ ABDEGCF	~~DFEBCA~~ DGEBFCA

VIII. Represent me:

Tree	Inorder	Preorder	Postorder
	~~ababc~~ a+b*a-(b|c)	~~ababc~~ *+ab-a|bc	~~abbca~~ ab+abc/-*

IX. Fill my routine:

Inorder	Preorder	Postorder

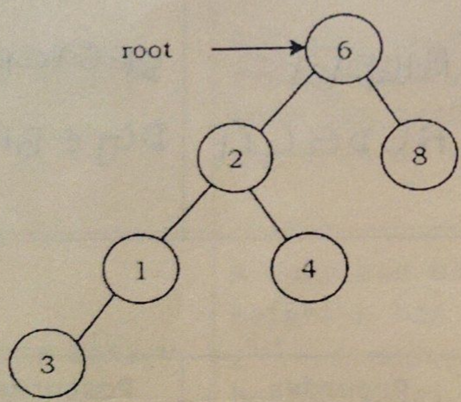
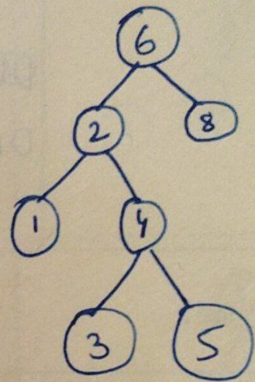
Left, root, right
void inorder (Node* Tree)
{ if (Tree != NULL){
inorder (Tree→left);
printf ("%d", Tree→data)
inorder (Tree→right);
}
}
	Root, left, right
	printf ("%d", Tree→data)
	pre order (Tree→left);
	preorder(Tree→right);
		left, right, root
		postorder (Tree→left);
		postorder(Tree→right);
		printf ("%d", Tree→data);

X. Fill my routine:

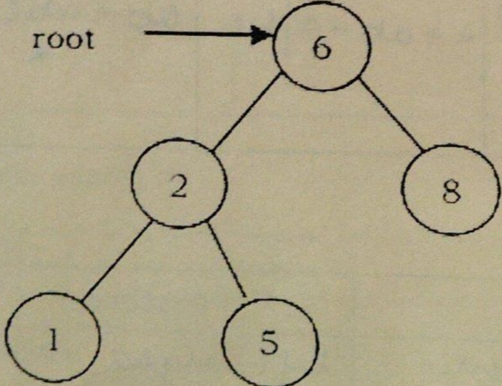
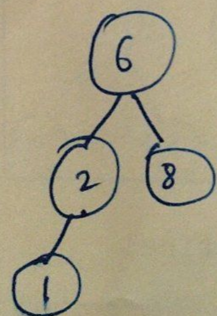
findMin (Binary Search Tree)	findMax (Binary Search Tree)

find min(Node *Tree)
{
If (Tree! NULL)
Inorder (Tree → left);
printf ("%d", Tree → data);
}
};
	findmax (Node * Tree)
	{
	If (Tree != NULL)
	inorder (Tree → right);
	printf ("%d", Tree → data);
	}
	};

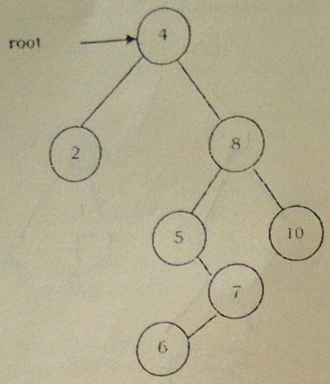
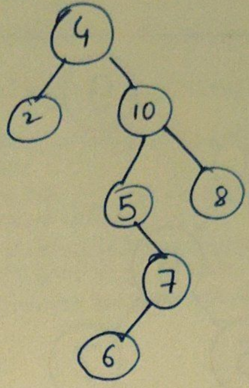
XI. Redraw me:

Binary Search Tree	insert(5)
	

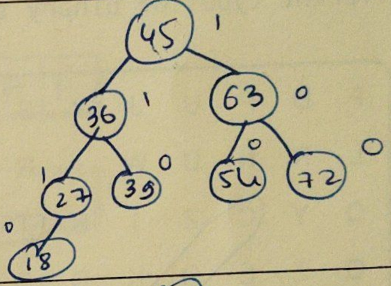
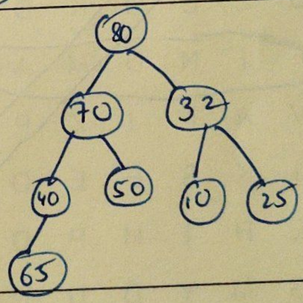
XII. Redraw me:

Binary Search Tree	delete(5)
	

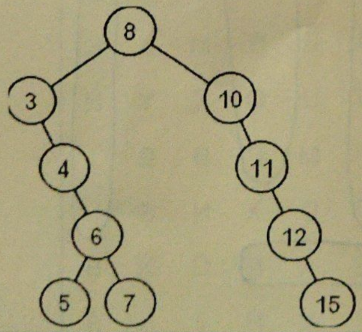
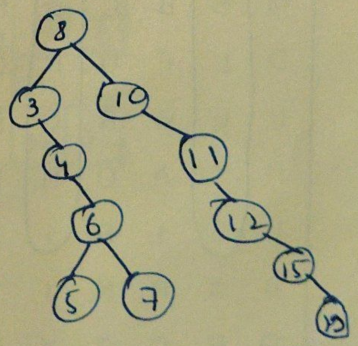
XIII. Redraw me:

Binary Search Tree	delete(8)
	

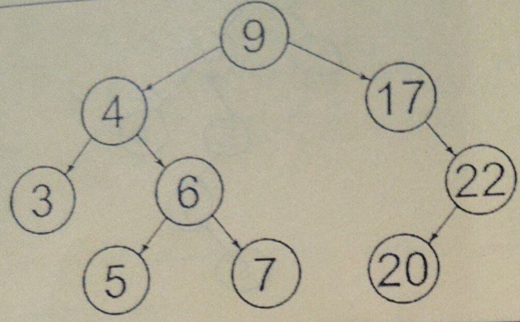
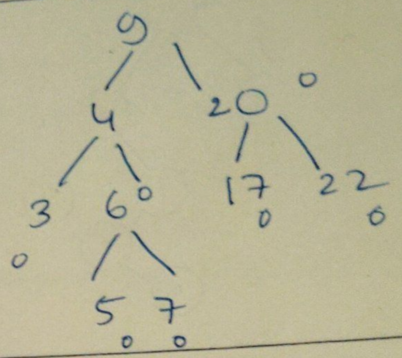
XIV. Draw me:

Concept	Description	Example
AVL Tree	Tree that are balanced. LST-RST Adelson velsky Landis	
Max Haep	Node>child Node Root-max value	

XV. Redraw me:

BST Tree	insert(19)
	

XVI. Redraw me:

Binary Tree	Find Balance Factor
	

XVII. Search me:

1. Tree traversals
2. Binary search tree operations
3. Different types of binary trees
4. Representation of binary tree

F	D	P	U	J	Y	S	G	E	R	Z	O	K	J	N	X	I	J
L	R	N	U	W	J	R	Q	E	N	U	E	A	F	B	D	P	X
Q	Y	C	Z	I	B	T	R	E	S	N	I	Z	L	M	G	N	Q
O	Z	E	O	K	D	Q	Q	D	Y	H	V	L	W	P	O	X	E
F	I	N	D	M	A	X	Z	S	P	T	U	A	O	J	R	U	X
V	A	F	J	Z	P	E	L	W	Y	F	A	C	B	E	A	R	B
J	K	S	E	E	O	L	O	U	J	E	P	Z	D	R	C	S	U
E	H	I	H	P	D	U	E	W	Y	Q	M	R	K	E	L	G	E
G	M	Y	D	U	N	B	G	T	J	O	O	C	D	D	S	G	J
F	R	S	T	R	I	C	T	J	E	E	S	N	M	R	E	A	S
Z	D	S	Y	E	F	S	Y	R	R	U	T	I	O	O	N	S	D
M	E	B	C	D	O	W	Z	P	L	J	V	M	R	T	M	F	E
D	L	F	U	R	C	H	N	Z	N	W	N	D	E	S	M	X	K
N	E	W	B	O	E	Q	L	U	T	Z	T	N	U	O	Z	Y	N
H	T	A	O	N	P	X	R	M	T	B	K	I	M	P	B	B	I
U	E	I	B	I	X	R	G	H	I	D	O	F	D	X	N	S	L
B	X	P	N	I	Y	C	O	E	L	I	N	E	A	R	C	X	B
Q	R	C	Z	K	X	P	M	Q	H	M	E	P	V	H	J	K	A

XVIII. Fill me:

Across:

1 The process of visiting all nodes of a tree is called tree ______.

3 Nodes with no children are known as ______.

4 The inorder traversal of the binary tree for an arithmetic expression gives the expression in an ______ form.

5 The postorder traversal of the binary tree for the given expression gives in ______ form.

7 A tree is a collection of ______.

9 The number of subtrees of a node is called its ______.

11 In binary search tree, to perform a findMax, start at the root and go right as long as there is a ______ child.

12 In binary search tree, to perform findMin, start at the root and go left as long as there is a ______ child.

13 A tree is said to be a binary tree if it has atmost ______ children.

Down:

2 Nodes with the same parent are called ______.

5 In a tree, every node except the root has one ______.

6 An ______ refers to the link from parent to child.

8 The ______ of ni is the length of the longest path from ni to a leaf.

9 For any node ni, the ______ of ni is the length of the unique path from the root to ni.

10 The preorder traversal of the binary tree for the given expression gives in ______ form.

11 The ______ of a tree is the node with no parents.