

Department of Computer Science

Lecture Outline

Data Structures – 4th CSE

Lecture: Trees, Binary Trees and Binary Search Trees

All Programming to be done in C language.

Classroom Lectures:

Lecture 15 - Introduction to Trees and Binary Trees and their Applications

Link for Lecture:

<https://youtu.be/TSpvZnCOwyk>

Lecture 16 - Binary Search Trees and their Implementation

Link for Lecture:

https://youtu.be/gSOQPyr_mlc

1. Trees	<ul style="list-style-type: none">• Trees• Terminology
2. Binary Trees	<ul style="list-style-type: none">• Definition of a Binary Tree• Types of Binary Trees• Height and Number of Nodes in a Binary Tree• Applications and Advantages.• Traversals in Binary Trees• Conversion of Postfix to Expression Trees using stacks
3. Implementing Binary Trees	<ul style="list-style-type: none">• Representing Binary Trees<ul style="list-style-type: none">- Static Implementation of Trees- Pointer Representation (Linked Lists Non-Linear)• Dynamic Implementation of Trees<ul style="list-style-type: none">- Making a Tree (Create)- Adding to Left and Right Sub Tree• Understanding Recursive Structure of Trees• Recursively Listing Directories

<p>4. Binary Search Trees and their Implementation</p>	<ul style="list-style-type: none">• Binary Search Trees Definition• Making a Binary Search Tree with a sequence of elements• Making a Binary Search Tree (BST)<ul style="list-style-type: none">- Make, Find in a BST- Finding Maximum and Minimum of a BST with recursion and iteration• Insertion and Deletion in a BST<ul style="list-style-type: none">- Printing in Inorder, Preorder and Postorder- Finding Maximum Depth, Count total number of nodes, Count leaf nodes and internal nodes
<p>5. Resource Links</p>	<ul style="list-style-type: none">• https://www.tutorialspoint.com/data_structures_algorithms/tree_data_s tructure.htm• https://www.tutorialride.com/data-structures/trees-in-data- structure.htm• https://bradfieldcs.com/algos/trees/introduction/• https://www.geeksforgeeks.org/binary-search-tree-data-structure/• https://www.geeksforgeeks.org/binary-search-tree-data-structure/• https://www.programiz.com/dsa/binary-search-tree