At this lab section, we will learn implementation of Binary Search Trees and make search, insertion, deletion operations on them.

Binary Search Trees

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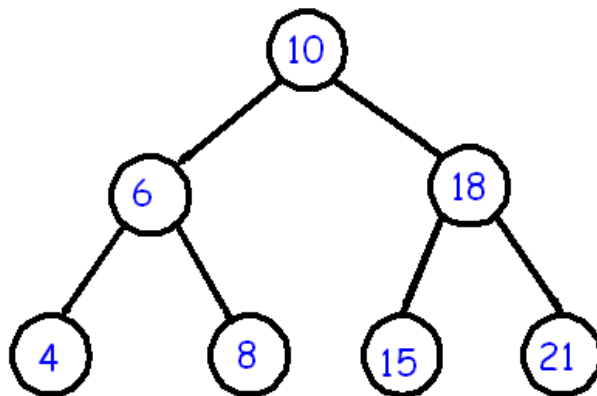Res. Asst. Fatih DİCLE

PART 1 – Binary Search Tree

A **Binary Search Tree (BST)** is a binary tree whose nodes contain Comparable objects and are organized as follows:

For each node in a binary search tree,

- The node's data is greater than all the data in the node's left subtree,
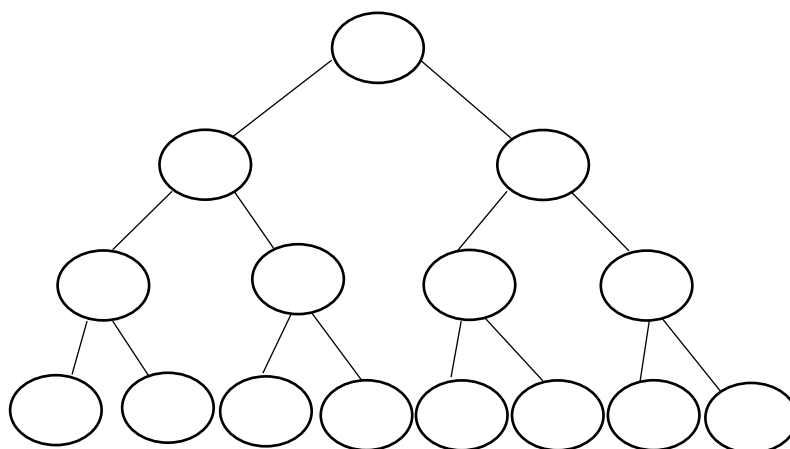- The node's data is less than all the data in the node's right subtree.

Exercise - 1

At this section, we will do some operations on a binary search tree according to BST rules.

Step – 1

Insert items to the tree and show the inserted version of the BST.

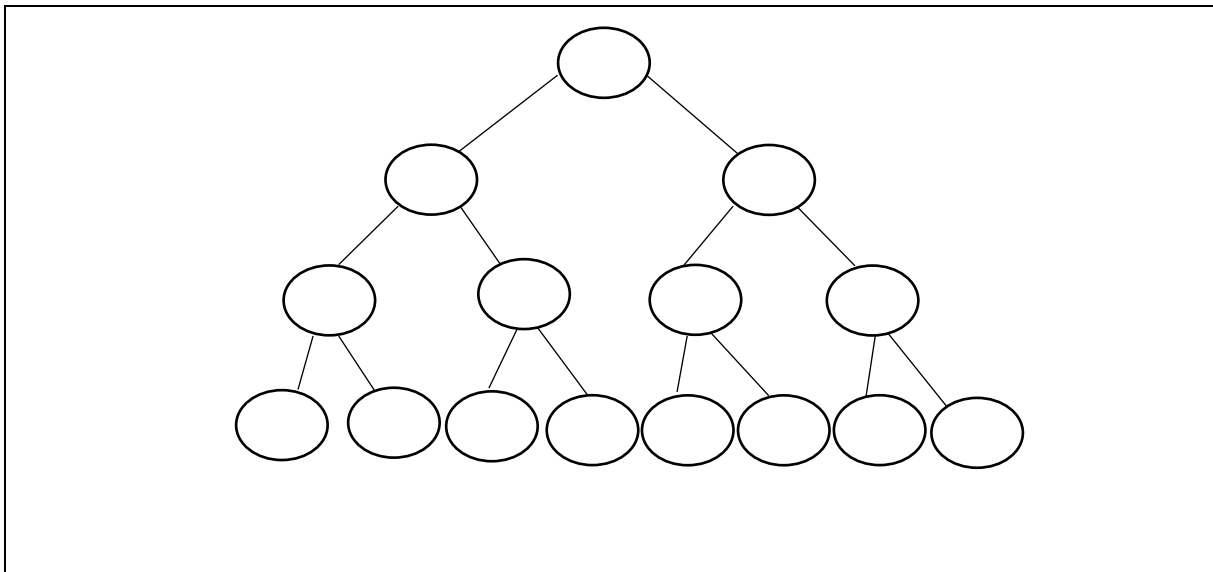Items = [11, 6, 8, 19, 4, 10, 5, 17, 43, 49, 30]

Search some items in the BST, write the visited node sequence below.

Search 5 ->

Search 30 ->

Step – 3

Show the final state of the BST after deleting 11, 4 and 49.
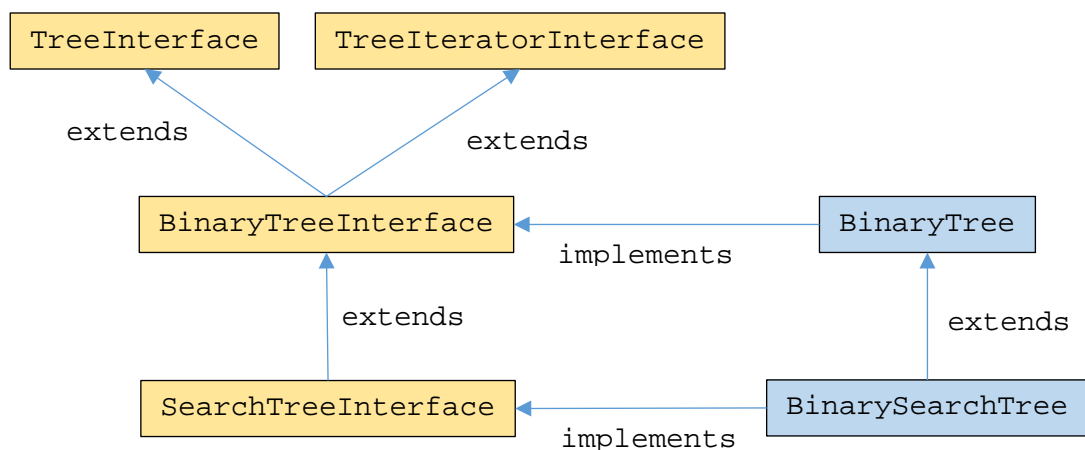

Exercise - 2

At this section, we will experiment insertion, deletion, and search operations on Binary Search Tree in Java.

Step – 1

You are given some ready to use classes in *src* folder. The class hierarchy is given below:

Create a new Java project and add given classes into your project.

Fill in the missing parts in findEntry, addEntry, and removeEntry methods of the *BinarySearchTree.java*.

Step – 3
Add a new class with the name Test.java. Create a *BinarySearchTree* instance. Read the given input file *StudentNumbers.txt* and insert all the items into BST.

Step – 4
Test whether the BST is empty or not.

Step – 5
Print the data in the root node.

Step – 6
Print the height of the BST.

Step – 7
Print the number of nodes in the BST.

Step – 8
Get the entry equals to your student number.

Step – 9
Test whether the BST contains your student number.

Step – 10
Remove your student number from the BTS.

Step – 11
Iterate and print the BTS by using in-order traversal technique.

Step – 12
Paste your final content of *Test.java* and your final output.

Your Test.java

Your Output