National University of Computer and Emerging Sciences

Laboratory Manual 08

for

Data Structures Lab

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Objectives:
> In this lab, students will practice:
> 1. Binary Search Trees

Task 1:
Implement a recursive function which should insert nodes in BST considering the following rules of BST:

> **a.** All nodes of left subtree are less than the root node
> **b.** All nodes of right subtree are more than the root node
>> bool insert(int d)

> If the data already exists in the BST, this function simply returns false and true otherwise
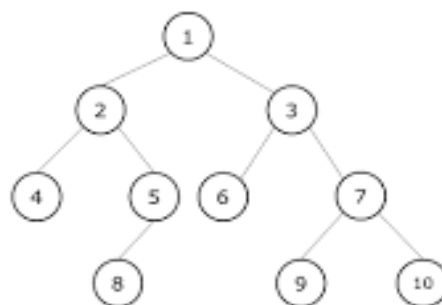
Example: Insert 5
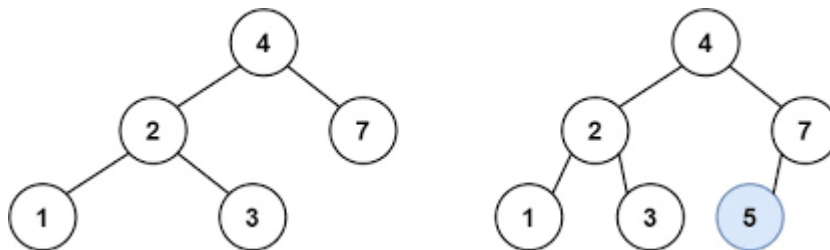
Create a function **'Delete'** which takes a value as an argument and deletes the node containing that value.

Task 2:
Create the following functions:

> **int kthsmallestelement(int k)** that takes a value k and return the k-smallest value from the
tree.

For example: If k=7, kth smallest will be 7

int kthlargestestelement(int k) that takes a value k and return the k-largest value from the tree.
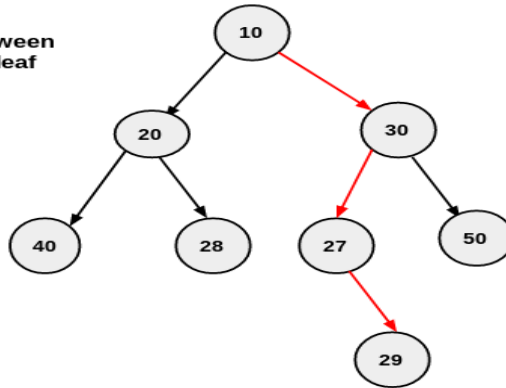
For example: If k=7, kth largest will be 3

Task 3:
Create a function which returns the height of BST

int height()

Number of edges between root and it's furthest leaf node =3.
Hence,
Height of tree = 3.

Task 4:

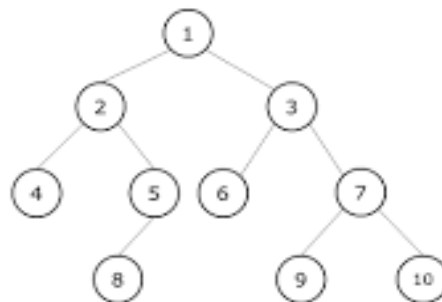Implement a function "length" which uses recursion to return the count of total nodes in BST

int length() const

Task 5:
Create a function "levelorderPrint" which prints the keys using level order traversal.

void levelorderPrint ()

Example:

Output: 1 2 3 4 5 6 7 8 9 10