## **Course: Algorithm CS 435**

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## **Assignment: W2D4**

1. Question 1 - Build a BST by inserting one element at a time. After each insert, please draw a picture. For this assignment, you can submit hand drawn pictures.

25, 20, 30, 28, 29, 15, 18, 23, 10, 35, 45, 33, 29

A picture containing object

Description automatically generated

1. Question 2 –
2. **Start from the BST you built.** Delete 30

A close up of a watch

Description automatically generated

1. **Start from the BST you built.** Delete 25

A close up of a logo

Description automatically generated

1. **Start from the BST you built.** Delete 28

A picture containing object, watch

Description automatically generated

1. Question 3 –
2. **Start from the BST you built.** Pre order traversal

Root – Left – Right

25 20 15 10 18 23 30 28 29 29 35 33 45

1. **Start from the BST you built.** Post order traversal

Left – Right – Root

10 18 15 23 20 29 29 28 33 45 35 30 25

1. **Start from the BST you built.** In-order traversal

Left – Root – Right

10 15 18 20 23 25 28 29 29 30 33 35 45

1. Question 4 -Write a recursive function to
2. Count the nodes of a BST

***Algorithm*** *countNodes(T)*

***Input*** *BST T*

***Output*** *number of nodes in T*

**if** T == null **do**

**return** 0

**return** 1 + countNodes(T.left) + countNodes(T.right)

1. Count the leaves of BST

***Algorithm*** *countLeaves(T)*

***Input*** *BST T*

***Output*** *number of leaves in T*

**if** T == null **then**

**return** 0

**if** T.left == null && T.right == null **then**

**return** 1

**return** *countNodes*(T.left) + *countNodes*(T.right)

1. Create a mirror image of BST

***Algorithm*** *createMirrorImage(T)*

***Input*** *BST T*

***Output*** *mirror image of T*

**if** T != *null* **then**

tmp ← T.left

T.left ← T.right

T.right ← tmp

*createMirrorImage*(T.left)

*createMirrorImage*(T.right)

**return** T