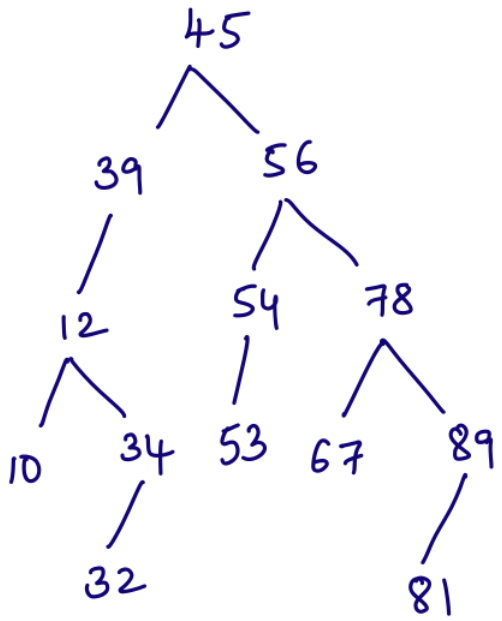
[CSL202] **2024-25-M**

TUTORIAL V

Date: **Sep 13, 2024**.

1. TRUE/FALSE: Every binary search tree is an AVL tree.
2. For the set of $\{2, 4, 6, 12, 16, 17, 21, 25\}$ of keys, draw (i) an AVL tree of maximum height and (ii) an AVL tree of minimum height .
3. Consider the AVL tree T given below.



   (a) Find the height of each node.
   (b) Insert a node with key 9 to the tree T. Draw the final AVL tree after insertion.
   (c) Insert a node with key 22 to the tree T. Draw the final AVL tree after insertion.
   (d) Draw the tree after deleting the node 34 from T.
   (e) Draw the tree after deleting the node 10 from T.
4. Suppose the following numbers are inserted in order into an empty AVL tree T:

$$50, 33, 44, 22, 77, 19, 64, 59, 29$$

Draw the final AVL tree T.

5. Given an AVL tree T and a range $[\ell, h]$, where ℓ and h are present in T. Design an algorithm to compute the number of nodes that lie in the range $[\ell, h]$. What is the running time?

6. Let T be an AVL tree on n nodes. If a leaf closest to the root is present at level k, then the height of the tree is at most $2k - 1$.

7. If a closest leaf is at level k then all nodes at levels $1, 2, \ldots k - 2$ have two childrean.