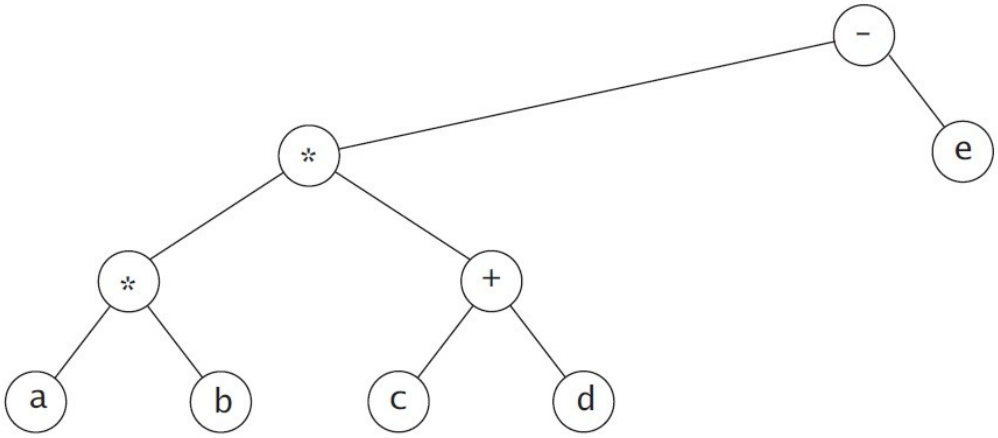
CS218 Data Structures

Spring 2020 FAST-NU, Lahore

Assignment 5 – Trees

Question 1. Give the prefix, infix, and postfix expressions corresponding to the expression tree in the figure below. (Expression trees have been discussed in book in section 4.2.2)



Question 2

a. Give a precise expression for the minimum number of nodes in a BST of height h.

b. What is the minimum number of nodes in a BST of height 7?

Question 3

a. Give a precise expression for the minimum number of nodes in an AVL tree of height h.

b. What is the minimum number of nodes in an AVL tree of height 7?

Question 4. Insert the following entries in BST and AVL tree respectively and draw both the resulting trees after every insertion.

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100, 60, 135, 120, 128, 75, 81, 114, 99, 108, 90
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Question 5. Two trees, $T1$ and $T2$, are *isomorphic* if $T1$ can be transformed into $T2$ by swapping left and right children of (some of the) nodes in $T1$. For instance, the two trees in the figure below are isomorphic because they are the same if the children of A, B, and G, but not the other nodes, are swapped. Give a linear time algorithm to decide if two trees are isomorphic.

Question 6. Write a routine to list out the nodes of a binary tree in *level-order*. List the root, then nodes at depth 1, followed by nodes at depth 2, and so on. You must do this in linear time.