

## Test 2 – C++ Weeks 6-9

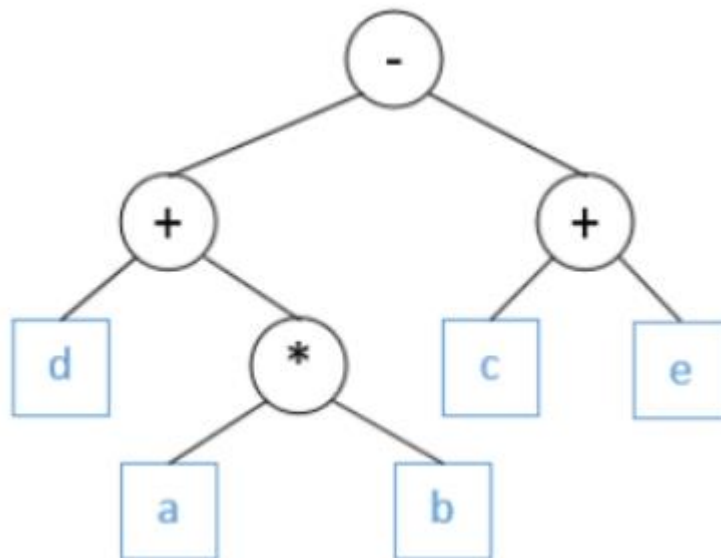
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### Problem 1

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Answer following questions:

- a) Expression  $(d + (a * b)) - (c + e)$  can be described by the Expression Tree below (LNR traverse):



Draw the Expression Trees of the following expressions:  $(2a + b) / ((c-d)*2 + (a-b))$

- b) Draw the BST that results when you insert items with keys:

E A S Y Q U E S T I O N

in that order into an initially empty tree.

- c) Construct an AVL tree by inserting one by one elements as follows:

21 67 47 100 77 92 87 86 16 6

- d) What are the minimum and maximum number of elements in a heap of height h?

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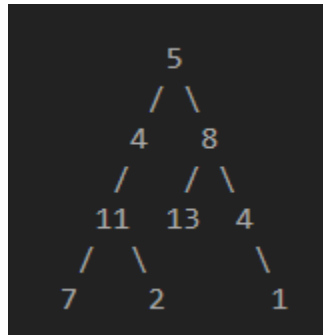
### Problem 2

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Given a binary tree and a sum, determine if the tree has a root-to-leaf path such that adding up all the values along the path equals the given sum.

For example:

Given the below binary tree and sum = 22, return **true**, as there exist a root-to-leaf path 5-4-11-2 which sum is 22.



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### Problem 3

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Using Heap to findout the three smallest numbers in the list:

32, 73, 62, 29, 79, 26, 67, 70, 43, 27, 4, 46, 7, 74, 5

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### Problem 4

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An cosmetician wants to represent a list of her clients' records (by their ID) using AVL tree. For each client we would like to store:

- Id (Integer number)
- Name (char[30])
- Age(Integer number)
- Gender(true if male, false if female)

Write a function to find a person by their Age and Gender that have smallest ID, then print out to the screen the information of that person.

Example: The output when find a man having age of 20

**Id: 13**

**Name: Sivic**

**Age: 20**

**Gender: Male**

If there are not any person satisfy the condition, print out to the screen **"No result"**.