Trees and Graphs

(For the below tasks, you may want to create a binary tree manually and use the same tree for all of these tasks.)

NB: All the methods as well as the main method/tester statements must be written in one class. DO NOT write a different class for each method.

Compile all your codes and simulation picture in ONE PDF and submit it.

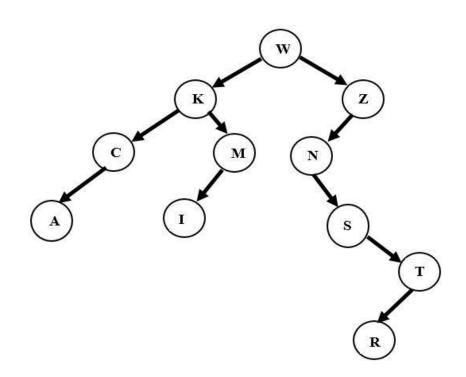
- 1. **RECURSIVELY** calculate the height of a tree.
- 2. **RECURSIVELY** calculate the level of a Node in a tree.
- 3. Print elements of all the Nodes of a tree using **Pre-order Traversal**.
- 4. Print elements of all the Nodes of a tree using **In-order Traversal**.
- 5. Print elements of all the Nodes of a tree using **Post-order Traversal**.

6. An adjacency matrix is given below:

	A	В	C	D	E	F	G
A	0	1	0	1	1	0	0
В	0	0	0	0	0	0	1
C	0	1	0	0	0	0	0
D	0	0	1	0	0	0	1
E	0	0	0	0	0	0	0
F	0	0	0	1	0	0	0
G	0	0	0	0	1	1	0

a) Draw the equivalent graph.

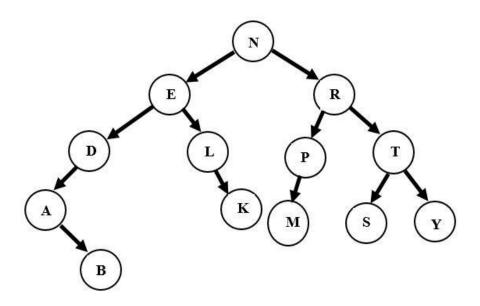
7. Consider the following tree:



Suppose we need to insert the sequence (3, 51, 6, 65, 17, 12, 1, 22, -3 and 15) into an initially empty binary search tree (of integers). Show the resultant Binary Search Tree.

[4 Marks]

<u>b)</u>



Do the following operations step by step on the above BST:

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1 Marks]

- a. Step 1: Remove node E with the help of its successor.
- b. Step 2: Remove node N with the help of its successor.
- c. Step 3: Remove node R with the help of its predecessor.