Assignment 3

Data Structures and Algorithms

Date of Submission: 20-09-18

1. (a) Write a function that counts the number of items in a binary tree.

(b) Write a function that returns the sum of all the keys in a binary tree.

(c) Write a function that returns the maximum value of all the keys in a binary tree. Assume all values are nonnegative; return -1 if the tree is empty.

1. (a) The height of a tree is the maximum number of nodes on a path from the root to a leaf node. Write a C function that returns the height of a binary tree.

(b) The cost of a path in a tree is sum of the keys of the nodes participating that path. Write a C function that returns the cost of the most expensive path from the root to a leaf node.

1. (a) A binary tree is said to be "balanced" if both of its subtrees are balanced and the height of its left subtree differs from the height of its right subtree by at most 1. Write a C function to determine whether a given binary tree is balanced.

(b) Write a C function that prints all the keys less than a given value v in a binary tree.

### How to construct a Binary Tree from given in order and Post order traversals. Two traversals are given as input,

### Inorder: 20, 30, 35, 40, 45, 50, 55, 60, 70

### Postorder: 20, 35, 30, 45, 40, 55, 70, 60, 50

### Design an algorithm to solve the above problem

### (a) Given a Binary tree and a number N, write a program to find the N-th node in the Postorder traversal of the given Binary tree.

### (b) Given two binary trees, check if the first tree is subtree of the second one. A subtree of a tree T is a tree S consisting of a node in T and all its descendants in T. The subtree corresponding to the root node is the entire tree; the subtree corresponding to any other node is called a proper subtree.