Assignment 5

1. (Weight: 30%) Draw an expression tree corresponding to each of the following:

   a. Inorder traversal is: `x / y + 3 * b / c`
   b. Postorder traversal is: `x y z + a b - c * / -`
   c. Preorder traversal is: `* + a - x y / c d`

2. (Weight: 20%) Show the tree that would be built by the following data lines. Is the resulting tree a binary search tree, a full tree, and/or a complete tree?

```
30
15
4
NULL
NULL
20
18
NULL
19
NULL
NULL
NULL
35
32
NULL
NULL
38
NULL
NULL
```

3. (Weight: 20%) **Programming:** Assuming we have a binary tree of integers, write a recursive member function to find the sum of nodes in a `Binary_Tree`

4. (Weight: 30%) **Programming:** Write a function that tests whether a binary tree is a binary search tree.

   Note: in a binary search tree, for each node, the values of all nodes in the right subtree are greater than the node, and the values of all nodes in the left subtree are less than the node. For instance, the following tree is not a binary search tree, because 15 must be less than 10.

   ```
        10
   7           12
   6    15    5    13
   ```