CS 2123
Summer 2014

Homework 4

Assigned: 6/23/2014
Due: 7/3/2014 11:59 pm

1. Searching a Binary Tree (25 pts)
Exercise 5.2.2. in the textbook.
You do not have to write a full C program, only the function that returns the level of the provided node pointed in the provided tree pointer. Your answer should be in the text document portion of your answers, not as a separate C source file.

2. Constructing a Binary Search Tree (50 pts)
Exercise 5.2.5. in the textbook.
Remember that each of your 51 repetitions needs to print the largest and smallest leaf levels. At the end of all 51 runs, your program will print a summary of level differences and the # of runs. E.g.,
Run Summary

Level Difference	# Runs
0	3
1	5
2	6
3	1
4	0
5	3

Use the following function to generate a random int from 1 to 1000 for each node you insert into your binary search tree:
```
int generateRandom() {
        return rand() % 1000 + 1;
}
```

and you should initialize the random number generator with the following line in your main function:
srand(time(NULL));

Note: to use the time() function, you need to include the header file <time.h> at the top of your C source file.

3. Understanding Huffman Encoding (25 pts)
Exercise 5.3.1. in the textbook.
You only have to write the encoding function based on the data structures provided in

the Huffman Algorithm section of the textbook. Your answer should be in the text document portion of your answers, not as a separate C source file.

Deliverables:
Answers to homework problems 1 and 3 should be typed and submitted in a single document.
Problem 2 should be submitted as one or more C source code files. I need all of the C source that you produce for this assignment problem so that I may compile and execute it.

Archive and submit the files in UTSA's Blackboard system (learn.utsa.edu) under Assignment 4.