CSE 2320 Lab Assignment 3

Due November 30, 2010

Goals:

1. Understanding of red-black tree constraints.

2. Application of recursion.

Requirements:

1. Write a linear-time Java program to test whether a binary tree satisfies the red-black tree properties.

   The simple input format corresponds to preorder traversal. An uppercase letter corresponds to a red node, a lowercase letter corresponds to a black node, and a "**.**" to the sentinel. The letter for each node is the key, but these are case-insensitive. If a tree includes n data nodes, then the sentinel will be processed $n + 1$ times. The input

   ```
   abc..d..ef..Gh..iJ..K..
   ```

   corresponds to the tree:
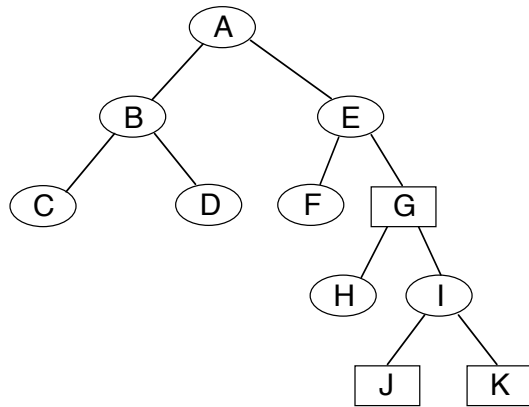
   which does not satisfy the inorder traversal property of binary search trees.

2. Email your program to `huawang2007@mavs.uta.edu` by 9:15 a.m. on November 30.

Getting Started:

1. The following test cases are useful:

   ```
   eCa..d..jG..M..
   ```

   ```
   dba..c..fe..Hg..Ji..k..
   ```

   ```
   mhDb..f..jI..K..on..qP..Sr..t..
   ```

   ```
   hDbA..C..fE..G..LkI..J..oM..N..
   ```

2. Your program may print any debugging information that you choose, but the last line of your output should indicate whether or not the tree satisfies the red-black tree properties. Your program must echo (in preorder) the tree *recursively* from your data structure. Likewise, your code for reading the tree must be recursive.

3. Your program should not prompt for an input file name. The maximum length for the input string is 53 symbols.

4. Pointers are not necessary for implementing this assignment. Simple tables are sufficient.