CSE 2320 Lab Assignment 4

Due April 20

Goals:

- 1. Understanding of red-black tree structural constraints.
- 2. Application of recursion.

Requirements:

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

The simple input format corresponds to preorder traversal. An "R" corresponds to a red tree node, a "B" to a black tree node, and a " \cdot " to the sentinel. If a tree includes n data nodes, then the sentinel will be processed n + 1 times. The input

```
BBB..B..BB..RB..BR..R..
ABC D EF GH IJ K (This line is not part of the input.)
```

corresponds to the tree:



2. Submit your program on Canvas by 12:45 pm on April 20. One of the comment lines should indicate the compilation command used on OMEGA.

Getting Started:

1. The following test cases are useful:

BRB..B..BR..R..

BBB..B..BB..RB..RB..B..

BBRB..B..BR..R..BB..BR..RB..B..

BRBR..R..BR..R..BR..R..BR..R.

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