Programming Assignment 1
Due Date: Tuesday, Feb 8 @ 2:00 p.m.

Download the code provided by the textbook in order to complete this program.

Write a program that

1.   Reads a word (series of characters) from the keyboard and builds a Binary Search Tree out of them. The assumption is that the word is in all caps. Use the code in the book to build this tree, and later display it.

You are also asked to write the following methods and add them to class `Tree` (in `Tree.java` that you download from the textbook's online resources).

2.   A method called `displayLeftSide` that displays the nodes on the left side of the tree as a word. This method **MUST be written recursively**. Add the proper method call in the driver class corresponding to the menu option.

3.   A method called `displayLeaves` that displays the leaves of a tree as a word. This method **MUST be recursive**. Add the proper method call in the driver class corresponding to the menu option.

4.   A method called `siblingSubtree` that displays the subtree of a node that will be searched based on user input.

In your driver class, you need to have the following menu to test the methods you wrote above: Please note that you first read the series of characters from the keyboard, build a BST, and then display the following menu:

```
Please choose an option:
1.    Display the tree
2.    Display the word built out of the characters on the left side of this
tree.
3.    Display the word built out of the characters that form the leaves of
this tree.
4.    Display the sibling subtree of a character node

      a.    Enter the character

5.    Exit.
```

The following could be an example of execution of this program.

If the user inputs the following series of characters:
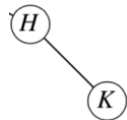
FHKBDA

The BST would look like the following:
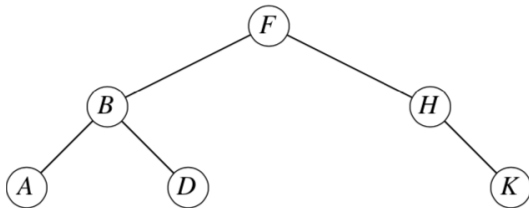
Please note that the method provided in the book will not display this tree in the above format! I am using this as an example to describe what is expected.

For this tree:
Option 2 should generate: **ABF**
Option 3 should generate: **ADK**
Option 4 based on character **B** should generate:

Again the method that you will be using to display trees will not generate this exact format. But you will use that method, and that format is acceptable.

- *The program must be written in Java.*

- *You must upload all relevant .java files, including the ones from the book, on blackboard to ensure successful execution of your code, by the due date.*

- *The submission that is missing required files/classes will be considered void.*

- *Programs that do not compile will be considered void.*

- *This is an individual assignment. If students submit fully or partially identical programs, all individuals involved will earn a grade of zero.*