Important

There are a few guidelines you must follow in this homework. If you fail to follow any of the following guidelines you will receive a **0** for the entire assignment.

1. All submitted code must compile under **JDK 7**. This includes unused code, don't submit extra files that don't compile. (Java is backwards compatabile so if it compiles under JDK 6 it *should* compile under JDK 7)
2. Don't include any package declarations in your classes.
3. Don't change any *existing* class headers, constructors, or method signatures. (It is fine to add extra methods and classes)
4. Don't import anything that would trivialize the assignment. (e.g. don't import `java.util.LinkedList` for a Linked List assignment. Ask if you are unsure.)
5. You must submit your source code, the `.java` files, not the compiled `.class` files.

After you submit your files redownload them and run them to make sure they are what you intended to submit. We are not responsible if you submit the wrong files.

Assignment

For this assignment you will be implementing a splay tree. In a splay tree there is a special operation called on nodes after certain operations are performed. This is the splay operation. The point of this is to bring the node to the top (root) of the tree. The idea behind this is that more frequently accessed nodes will be at the top.

Important things for this assignment:

1. use the predecessor when removing something with two children
2. treat nulls as positive infinity

There are multiple ways the above things could be done to correctly implement a splay tree, we are requiring you to implement them this way or you may lose points.

Splay

You call splay on a node after an operation is performed on the tree. It is generally called on the node found or added. In the case of removal the node splayed is the parent of the node removed if it exists.

Rotations

These rotations are used to move a node to the root, they are called multiple times (with the exception of zig) throughout a single call to splay. Descriptions of when to use them are below, if it is not clear images of the rotations can be found on wikipedia (http://en.wikipedia.org/wiki/Splay_tree)

zig

This operation is called at most once whenever splay is called. It only happens when the node being splayed is the child of the root node, then a simple zig rotation occurs.

zig-zig

This operation is called when the node is a left child and its parent is a left child, or when the node is a right child and its parent is a right child.

zig-zag

This operation is called when the node is a left child and its parent is a right child, or when the node is a right child and its parent is a left child.

Deliverables

You must submit all of the following files.

1. `SplayTree.java`

You may attach them each individually, or submit them in a zip archive.