CSI 508. Database Systems I – Fall 2015

Programming Assignment II

The total grade for this assignment is 100 points. The deadline for this assignment is **11:59 PM, December 15, 2015**. *Submissions after this deadline will not be accepted.* Students are required to enter the UAlbany Blackboard system and then upload a .zip file (in the form of [last name]_[first name].zip) that contains the Eclipse project directory and a short document describing:

- any missing or incomplete elements of the code
- any changes made to the original API
- the amount of time spent for this assignment
- suggestions or comments if any

In this programming assignment, you need to complete a Java program that demonstrates how B+-trees run. For example, Figures 1 and 2 show how a B+tree can change as a key '6' is inserted into the tree.

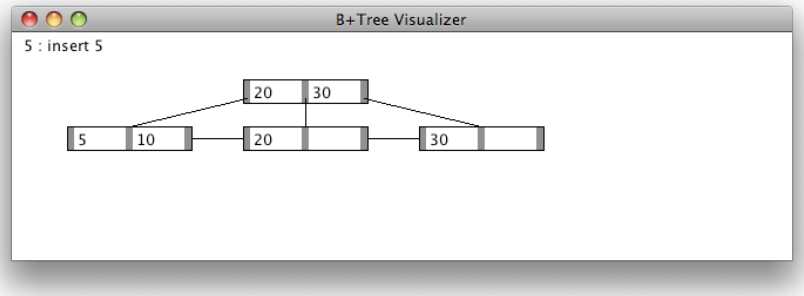

Figure 1: Before Inserting 6

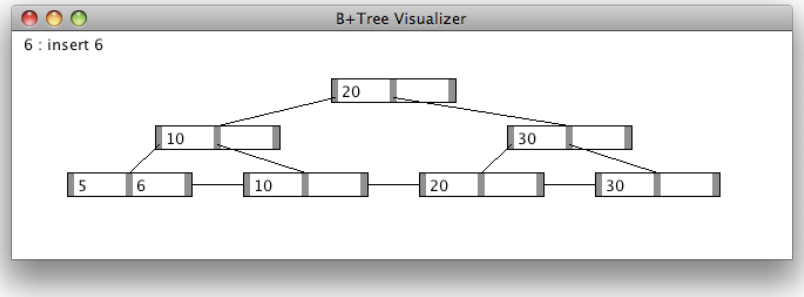

Figure 2: After Inserting 6

You first need to run Eclipse on your machine and import the "`bplus_tree`" project (see Appendix A). This assignment provides an eclipse project that contains a B+-tree visualizer (see `BPlusTreeVisualizer.java`) and a partially implemented B+-tree class (see `BPlusTree.java`).

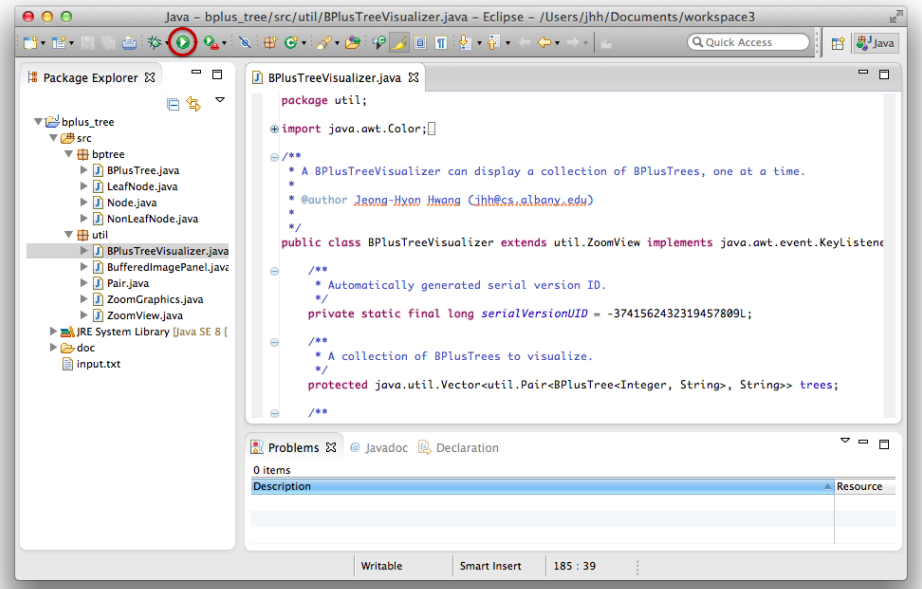

Figure 3: Eclipse

In `BPlusTree.java`, methods for finding/inserting a key-value pair are already implemented (see `public void insert(K key, V value)`). For this assignment, you need to implement the `public void delete(K key, V value)` method so that we can also delete key-value pairs from the tree (refer to page 498 in the text book). Within the method, please add *detailed comments* so that every step of deletion can be clearly understood. Insufficient comments will negatively affect your grade.

As a side note, the visualizer executes both *insert* and *delete* commands defined in the `input.txt` file (see the "`bplus_tree`" project directory). Pleasure ensure that your code works well even if you change the *degree* of the B+-tree and the *insert* and *delete* commands in `input.txt`.

You can play with the visualizer as follows:

1. move to the previous/next frame (left and right arrow keys, respectively)
2. zoom in/out (up and down arrow keys, respectively, or left and right double clicks)
3. panning ([ctrl] key + left/right/up/down arrow keys, or mouse drag and drop without pressing any key)

Good luck! I hope this assignment will help you better understand how B+-trees run.

Importing the `bplus_tree` Project

1. Run Eclipse. In the menu bar, choose "File" and then "Import". Next, select "General" and "Existing Projects into Workspace". Then, click the "Browse" button and select the "`bplus_tree.zip`" file contained in this assignment package.
2. Once the project is imported, you can choose `BPlusTreeVisualizer.java` and then run the program by clicking the icon highlighted in Figure 3.