

Lab 4 (Due March 8th)

Instead of using a linked list to resolve collisions, as in separate chaining, use a binary search tree. That is, create a hash table that is an array of trees. You can use the `hashChain.java` program as a starting point and the `Tree` class from the `tree.java` program. To display a small tree-based hash table, you could use an in-order traversal of each tree.

The advantage of a tree over a linked list is that it can be searched in $O(\log N)$ instead of $O(N)$ time. This time savings can be a significant advantage if very high load factors are encountered. Checking 15 items takes a maximum of 15 comparisons in a list but only 4 in a tree.

Duplicates can present problems in both trees and hash tables, so add some code that prevents a duplicate key from being inserted in the hash table. (Beware: The `find()` method in `Tree` assumes a non-empty tree.) To shorten the listing for this program, you can forget about deletion, which for trees requires a lot of code.