

In this programming assignment, you will demonstrate your knowledge of dynamic data structures (in particular, linked lists) by revising the dictionary program from Programming Assignment 1 to incorporate dynamic data structures.

## New Internal Requirements

For this assignment, you should replace your Database class with another implementation which uses a *sorted two-level linked list* to store the information internally.

The nodes in the upper-level linked list will represent terms, with one node per term. Each term node will contain a reference to a linked list of definitions for that term.

You should maintain the items in each linked list in sorted order. The upper list should be sorted by term, in standard alphabetical order. The lower list should be sorted by sequence number.

You may use any variation on linked lists which you desire; dummy head nodes, head/end pointers, doubly-linked lists, *etc.*. You may implement additional classes as desired in order to manage the list. (In particular, consider implementing “Node” classes which contain links to other objects, such as **Definition** objects.)

You are *explicitly prohibited* from using Java’s built-in **LinkedList** class for this assignment. (You will be using that class in Programming Assignment 3.)

## New Functional Requirements

Your program will be an extension of Programming Assignment 1, and thus should operate in the same manner as that assignment, unless otherwise specified herein. In particular, this means that any errors present in your submissions for Programming Assignment 1 should be fixed for this assignment.

The following new requirements should be implemented as well:

- The print database command should print the contents of the database in the same sorted order in which they are stored.
- A new command should be implemented which allows the user to insert a new definition from the main menu. If selected, the program should prompt the user for all the necessary information and insert the definition into the database appropriately. (Note that this may require adding entries to both the term list and the corresponding definition list.) If the user enters a sequence number already in use for that term, the entry should be rejected and the user notified.

## Submitting Your Program

Before 11:59:59 p.m., Wednesday, 2 February 2022 (4th Wednesday), you must upload a zip archive to the course Blackboard assignment for Programming Assignment 2. This zip archive must contain all source code files for your program, including a class named `Prog2` with a `main` method. You may optionally submit a description of errors remaining in your program through the “Add Comments” section in your Blackboard submission.

## Notes

1. *Plan for the future!* If your submission for Programming Assignment 1 was well designed, the number of changes to classes outside of the Database class should be minimal. In Programming Assignment 3, you will be asked to replace the Database class with an implementation of a different dynamic data structure; again, changes outside of the Database class should be minimal. Design your program with this in mind.
2. You are urged *not* to use generics in completing this assignment. There are subtleties regarding the use of generics in sorted data structures that we have not discussed yet. If you wish to use generics, please consult with the instructor *early*.
3. Keep in mind that the midterm will be held on 11 February 2022 (5th Friday). Finishing this program (and understanding it) will be excellent preparation for the exam ...