**CSC 102**

**Lab Linked Lists**

*Learning Objectives*:

* Designing and implementing a Linked List class.
* Designing and implementing an Iterator.
* Instantiating Linked List objects.
* Exceptions and exception handling.

*Deliverables*:

Utilizing code fragments from the handouts, the book, and those developed in class lectures, implement a Linked List class. The Linked List class should contain a Node inner class, a reference to the first node, and minimally implement the following methods:

* addFirst
* getFirst
* removeFirst

In addition, implement an inner class that functions as an iterator for your linked list class. The iterator should minimally implement the following methods:

* next
* hasNext

Implement an Exception that can be thrown when the class attempts an illegal operation.

Create a program that instantiates a linked list object (from the class you just created). The program should contain statements that demonstrate the functionality of the Linked List and the iterator, using each method at least once. Make sure your program handles exceptions generated by the class properly. Finally, instantiate another linked list object, and allow the user to input an arbitrary number of integer values (for example, designate the end of input by a sentinel value). Use the iterator you developed to iterate over the values in the linked list and sum them, printing the sum.

Extra Credit:

Implement a doubly-linked list, with references to next and previous nodes, along with the appropriate methods.