

CSCI 2120

Homework 5: Lists and Iterators

Introduction

For this assignment you will write an implementation of a doubly linked list and an iterator class for that list.

An Iterator is an object that "holds" a place in a data structure and can be moved around stepwise through the data structure. In order for you to get a better feel for this type of an object, which is ubiquitous in more complex data structures, you'll be implementing an iterator for a fairly simple data structure, a doubly-linked list. This assignment will also give you some practice working with nested classes as well, since the Nodes which hold the data are defined in a nested class inside of LinkedList.

Procedure

1) You are provided an implementation singly-linked list and a partially implemented Iterator class. Starting with this implementation, modify it so that it is a doubly-linked list, and finish the implementation of a class for an Iterator that can traverse this list both forwards and backwards.

Here's a link to how java's built-in Iterator class works with their generic data structures:
<https://docs.oracle.com/javase/8/docs/api/java/util/Iterator.html>

You do NOT need to implement the Iterator's "delete" method.

2) Write JUnit test classes that test **all** the functionality of your new linked list and iterators.

BONUS) (20 points) – rewrite the Iterator so that it is an inner class of the LinkedList, and modify your tests appropriately.

Submission

You will add, commit, and push your program to gitlab. Label your homework folder "HW5" in your repository. If you attempt the bonus, make a subdirectory called "bonus" which contains a FULL implementation that can be run and tested.

Grading

All the "stubbed" methods in the code should be implemented and working, and your iterator should work in concert with your linked list as described in the comments.