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Lab 6 Report

INTRODUCTION

This lab introduces the use of iterative and linked lists. The main goal is to measure the execution time of a linear search using the classical for loop versus using iterative. The lab consists of creating a class called MyLinkedList which is a singly linked, non circular list where each node only has one link next and the list has a head and tail link. Another class MyLinkedListIterator is also created to implement the iterator interface. A class MyListIntegerContainer will inherit from MyLinkedList and is used to test the performance of the two different searching techniques.

Unit Tests

The Node , MyLinkedList and MyListIntegerContainer were all unit tested to verify that they behave as they are intended to. Below is a screenshot of the unit test result. It is all working perfectly.

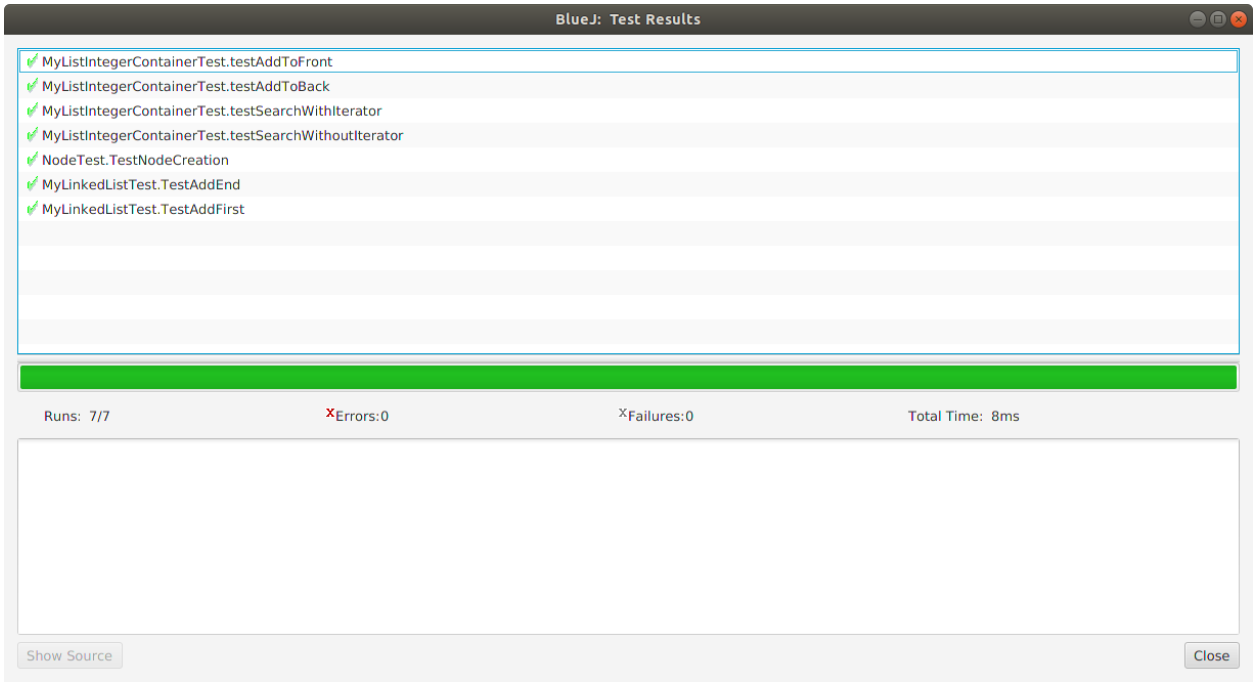

Figure 1: Screenshot Unit Testing Window

Required Output

Theoretically, the performance of a linear search using the iterative and the regular for loop is the same with a big O of O(n). Our expectation is that the two plots are linear and they are not far from each other.

When the experiment was realized, our assumption was correct because the two outputs were indeed linear. The result show that the searching with an iterator takes more time but the gap is not very big.

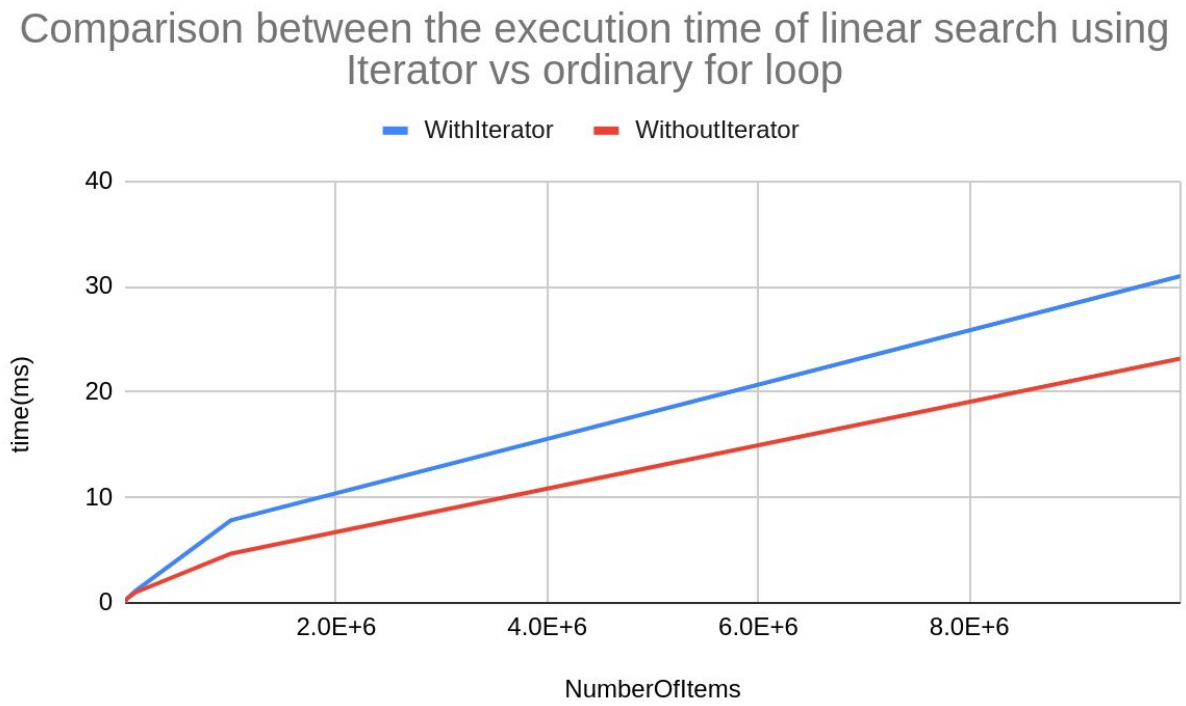

Figure 2: Comparison of the searching using iterator (blue) and using for loop (red)

When performing this measurement, the value of the item that was to be searched was supposed to be in the list. The two methods had to use the same container in order to compare them. In my design I used the last element as the item to search for. Note that the range of the generated number is 0-1000. It is possible that one number appears multiple times. The algorithm will consider the first one of them.

Trouble Report

N/A

References

Michael Kölling (2015). Unit Testing in BlueJ https://www.bluej.org/tutorial/testing-tutorial.pdf

Oracle. (2014). Interface Iterator.

https://docs.oracle.com/javase/8/docs/api/java/util/Iterator.html

Weiss, M. A. (1998). Data structures and problem solving using Java. ACM SIGACT News, 29(2), 42-49.