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Lab 7 Report

INTRODUCTION

In this lab, we created a class called Pair that can hold a value and key and another class called MyListArray which performs different operations with Pair. MyListArray possesses a function called quicksort which uses the algorithm from the book and another quicksort method which is the stable version of the quicksort. MyArrayList also possess a function called Binary search which basically proceed to a binary search of the pair arrayList

Unit Tests

The Pair class and arrayList Test were all unit tested to make sure that every function works as they are intended to. The screenshot of the unit test is as follows.

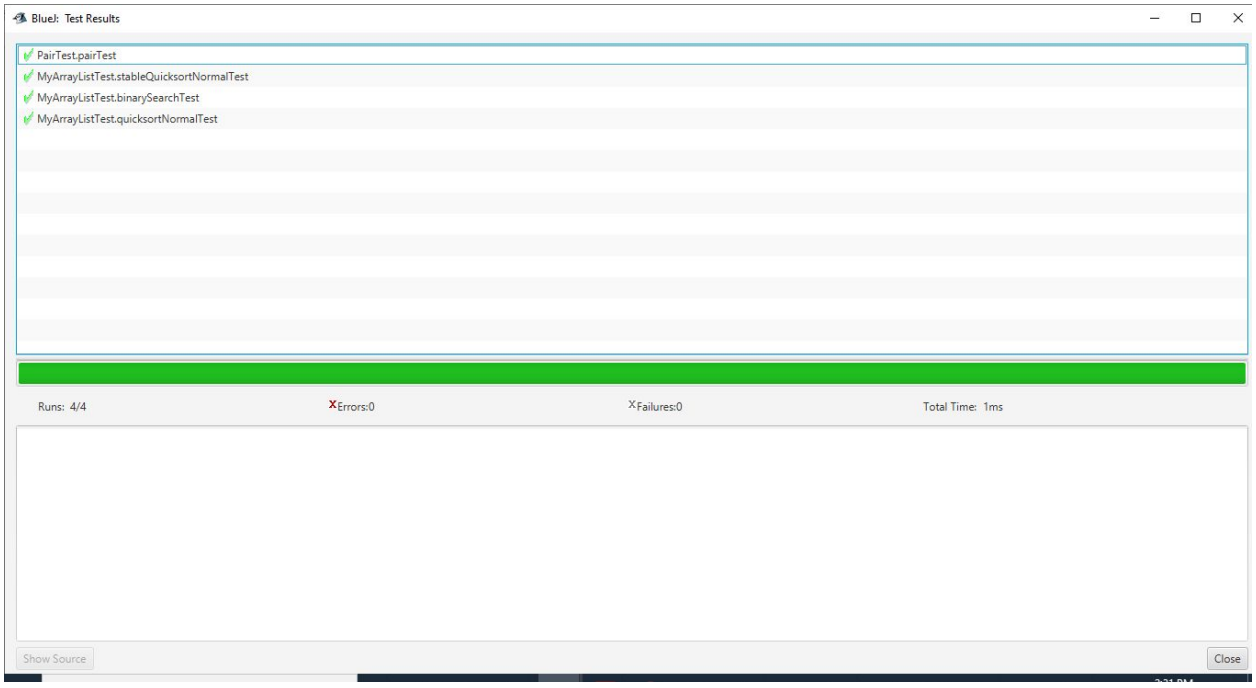

Figure 1: Screenshot Unit Testing Window

Required Output

The stability of a sorting algorithm is concerned with how the algorithm treats equal (or repeated) elements. Stable sorting algorithms preserve the relative order of equal elements, while unstable sorting algorithms don't. In other words, stable sorting maintains the position of two equals elements relative to one another.

Below is the output of my quicksort algorithm.

```
Original Array   [(3 , 4), (54 , 22), (432 , 22), (42 , 72), (564 , 2), (13 , 72), (745 , 1)]
Quicksort:       [(745 , 1), (564 , 2), (3 , 4), (432 , 22), (54 , 22), (42 , 72), (13 , 72)]
Stable Quicksort: [(745 , 1), (564 , 2), (3 , 4), (54 , 22), (432 , 22), (13 , 72), (42 , 72)]
```

Notice how in the Normal quick sort, the pair (432,220) and (54,22) succeed each other. However, in the stable quicksort they are swapped because the key 54 is less than 432.

Trouble Report

The sorting algorithm in the book is not complete. There are additional methods to be implemented.

References

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

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