

CS150 Lab5

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1. Results

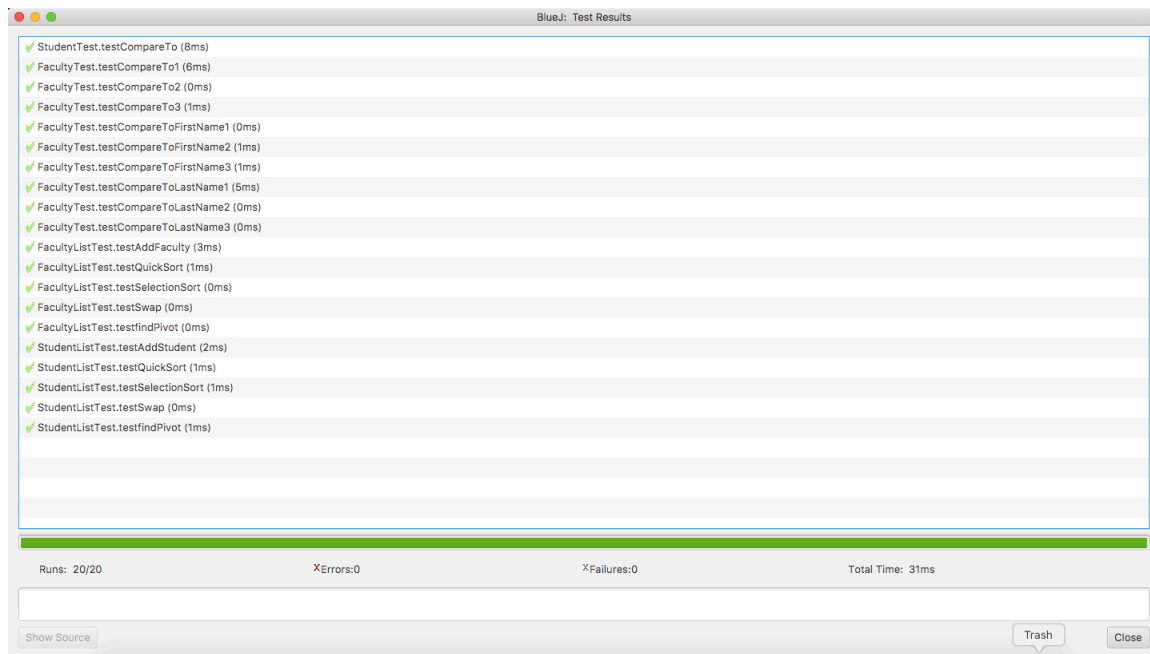


Figure 1. JUnit Testing

Size	Student Quick Sort	Student Selection Sort	Faculty Quick Sort	Faculty Selection Sort
5	108788	21194	419124	37427
15	134715	123150	2043643	371348
30	354699	271998	2463632	1558159
40	372653	287062	1660762	2593648
50	344173	523684	1709187	3582887

Table 1. Sort time (nanoseconds)

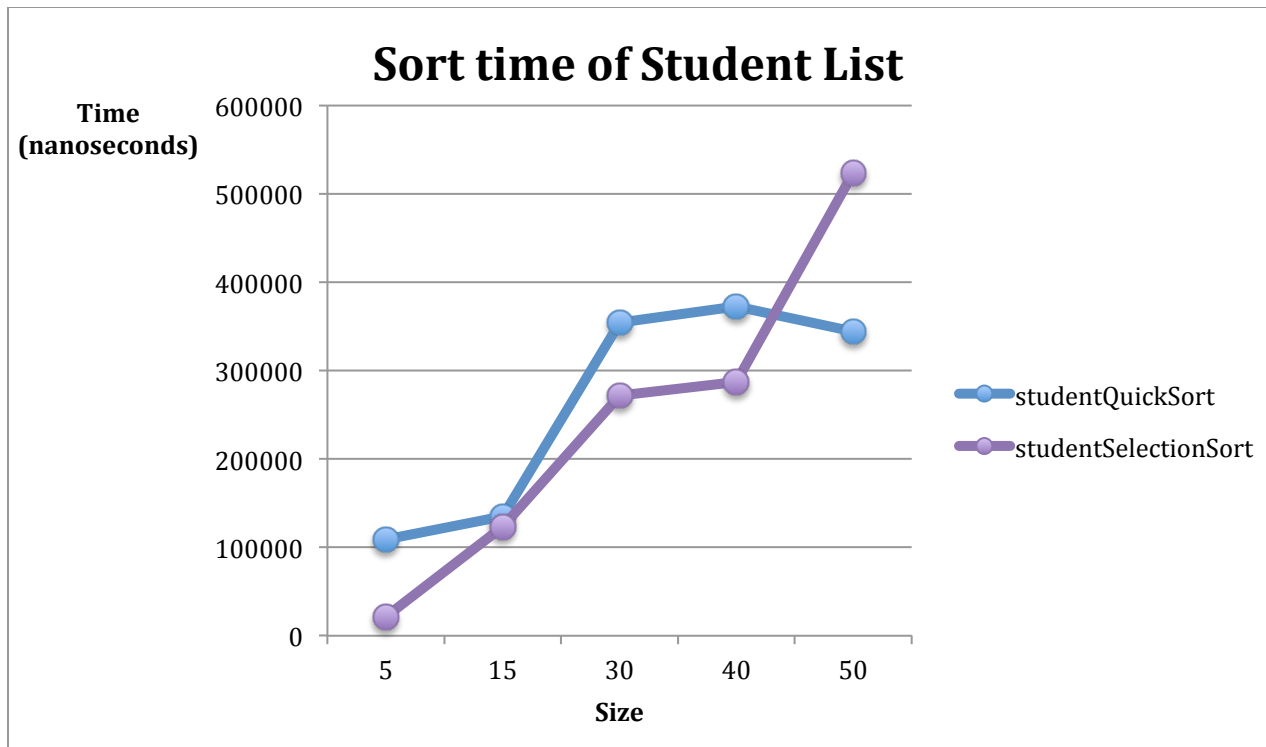


Figure 2. Sort Time of Student List

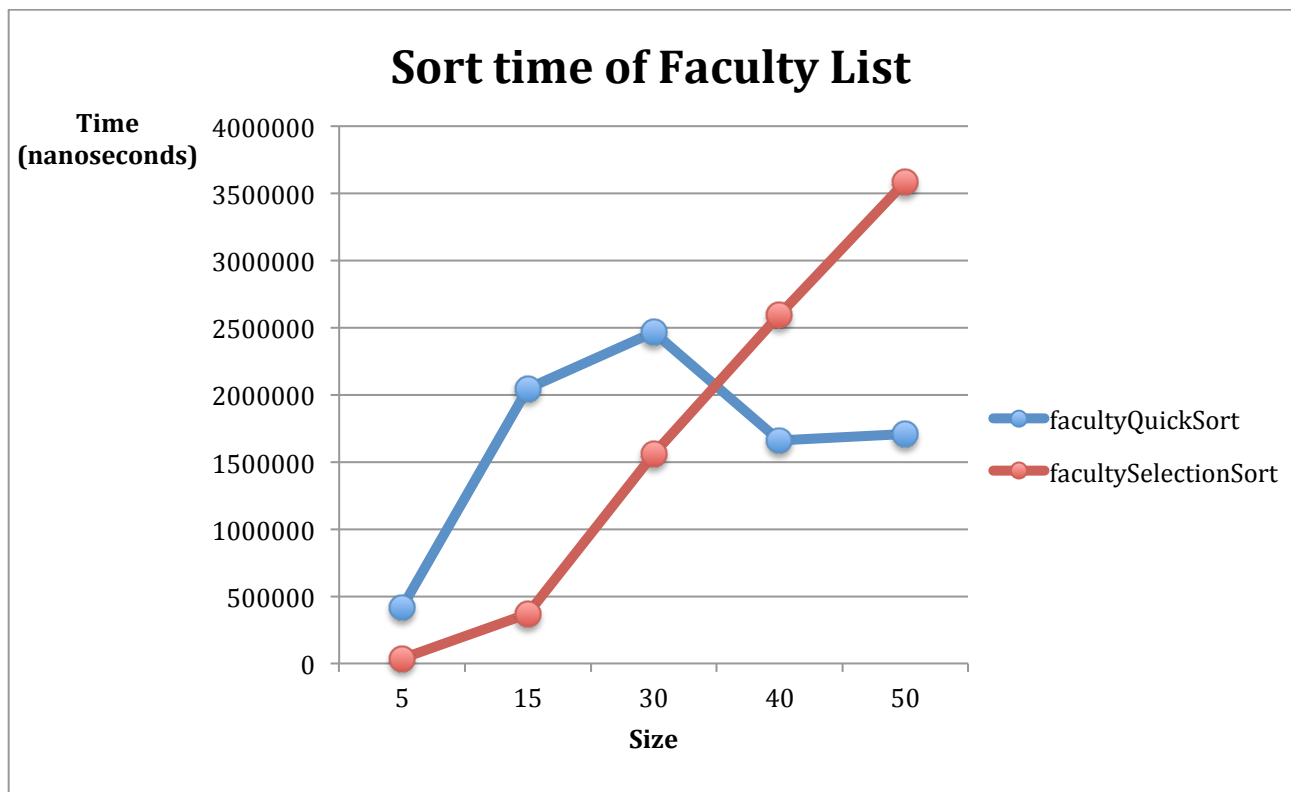


Figure 3. Sort Time Of Faculty List

In theory, we expect the complexities of Quick sort (“11.09.01 - Introduction,” n.d.) (“11.09.02 - Partition,” n.d.) and Selection sort (“11.06.01 - Selection Sort,” n.d.) are $O(n \log n)$ and $O(n^2)$, respectively. In Figure 2 and Figure 3, we can see that the shape of the graphs seems to match with our complexity expectations. In particular, the growth of Quick sort run time slows down and diverges from Selection sort as the input size increases. However, because of small input sizes, we have not been able to observe a significant difference between Quick sort and Selection sort.

Note that both Quick sort and Selection algorithms are taken from the course’s online textbook. Other materials such as Abstract class (“Abstract Methods and Classes (The Java™ Tutorials > Learning the Java Language > Interfaces and Inheritance),” n.d.), LinkedList (“LinkedList (Java Platform SE 7),” n.d.), and Comparable Interface (“Comparable (Java Platform SE 7),” n.d.) are from the API.

2. References

- 11.06.01 - Selection Sort. (n.d.). Retrieved September 10, 2017, from https://canvas.instructure.com/courses/1171720/assignments/6432392?module_item_id=12945299
- 11.09.01 - Introduction. (n.d.). Retrieved September 29, 2017, from https://canvas.instructure.com/courses/1171720/assignments/6432401?module_item_id=12945321
- 11.09.02 - Partition. (n.d.). Retrieved September 29, 2017, from https://canvas.instructure.com/courses/1171720/assignments/6432402?module_item_id=12945323
- Abstract Methods and Classes (The Java™ Tutorials > Learning the Java Language > Interfaces and Inheritance). (n.d.). Retrieved September 29, 2017, from <https://docs.oracle.com/javase/tutorial/java/IandI/abstract.html>
- Comparable (Java Platform SE 7). (n.d.). Retrieved September 29, 2017, from <https://docs.oracle.com/javase/7/docs/api/java/lang/Comparable.html>
- LinkedList (Java Platform SE 7). (n.d.). Retrieved September 17, 2017, from <https://docs.oracle.com/javase/7/docs/api/java/util/LinkedList.html>