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COS 285

Assignment 2

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Analysis for Insertion Sort methods

MyArrayList's Insertion Sort without parameters (6.a and 6.b)

By running two '.sort()' method calls sequentially the output times were 159 milliseconds, and 1 millisecond respectively. This is to be expected, as an Insertion Sort has a time complexity of $O(n^2)$ for average and worst cases, and a time complexity of O(n) for best cases. In the first case, the MyArrayList data structure was unsorted, therefore its runtime approached a quadratic time complexity. However, with the second method call the program executed in linear time because the data structure had already been sorted in the first method call.

MyArrayList's Insertion Sort with Comparator<Flight> Parameter (7.a and 7.b)

By running two '.sort(Comparator<? super T> comparator)' method calls sequentially the output times were 96 milliseconds, and 1 millisecond respectively. As with above, it is expected that the first method call would have a significantly longer runtime, given the discrepancies between the time complexities of Insertion Sort methods applied to unsorted vs. sorted linear data structures.

One final note, the runtime for both 6.a and 7.a will always be slowed due to the absence of caching during the first reference to an object in memory.