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CS2123

Assignment 5

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1)

1-1) The loops through the printf statement n times, and is therefore O(n)

1-2) The outer loop iterates n times. The inner for loop iterates a 1000/i times, which due to integer dvision can occur a maximum of 1000 times. Therefore the inner loop is O(1) since 1000 is a constant. Overall the loops are O(n).

1-3) The outer loop iterates n times. The middle loop iterates n-i times, which is a max of n times. The inner most loop iterates i times, and i is always less than n since the outer loop terminates when i equals n. Therefore each of these loops is O(n), and the overall big-Oh is O(n3)

4) The insertion sort with a circular array is definitely more efficient. In terms of inserting a new element or shifting elements the circular array cuts both operations approximately in half. Since we are always starting at the mid point, we can guarantee that we are at most shifting half of the array, and that we also only have to search roughly half the array to find the index to insert the element at. The standard insertion sort took 2525 assignments to sort the array. The circular array with two-way insertion sort took 1290 assignments. Overall we decreased our sort time by 48.91%.