**CSE204 :Data Structures and Algorithms Sessional**

Offline-2: Problem 1

Report on:

Comparison between

Insertion Sort and Selection Sort

Submitted by:

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**Time Complexity Analysis:**

Best Case Analysis:

The best case for a sorting algorithm occurs if the array to be sorted is already sorted beforehand. In case of insertion sort, the inner loop runs only once in each case, resulting in n steps in outer loop. So the best case time complexity of insertion sort is O(n).

In case of selection sort, in each inner loop, the program does n steps to find the minimum, irrespective of whatever the case is. So outer loop runs n times and inner loop runs n times. The complexity of selection sort is of n\*n order, i.e O(n2).

Average Case Analysis:

In average case, insertion sort implies that the outer loop will run n times and inner loop<= n times. So time complexity of insertion sort in average case is O(n2).

Selection sort will run inner loop n times, and outer loop n times. So time complexity of selection sort in average case is O(n2).

Worst Case Analysis:

The worst case for any sorting algorithm is when the array to be sorted is already sorted in reverse order.

In worst case, insertion sort will run its outer loop n times and inner loop <=n times. Time complexity of insertion sort in worst case is O(n2).

In worst case too, selection sort will run inner loop n times, and outer loop n times. Time complexity of selection sort in worst case is O(n2).

**Machine Configuration:**

Processor: Intel® Core(TM) i7-7500U CPU @ 2.70GHz 2.90GHz

RAM : 8.00 GB (7.80 GB usable)

Operating System : 64 bit Windows 10 pro

