Fill in this Report (two-three pages, type and print)   **Student's Name: Viraj Sonavane**

Fill in the table below stating the theoretical asymptotic time-complexity and space-comlexity (using big-O notation) for each of the algorithms (look up the lecture notes):

Algorithm	Big-O of Time	Big-O of Space
Insertion	O(n^2)	O(1)
QuickSort	O(n logn)	O(log n)
Selection	O(n)	O(n)

Experiment1: Comparison of QuickSort and Insertion to sort all the suffixes of a given string S

Input File	Size of S	Time, sec, QuickSort	Time, sec, Insertion
chrY_50.txt	3000	0.005	0.06
chrY_100.txt	6000	0.009	0.026
chrY_150.txt	9000	0.01	0.60
chrY_200.txt	12000	0.02	1.06
chrY_250.txt	15000	0.02	1.67

Insert your graph below (make sure to use different line markers to distinguish lines from different algorithms):
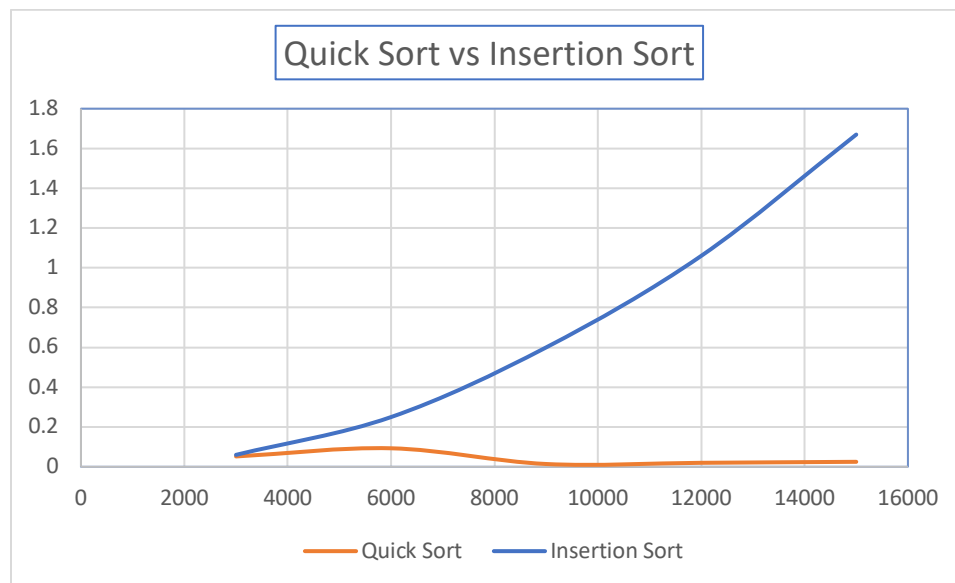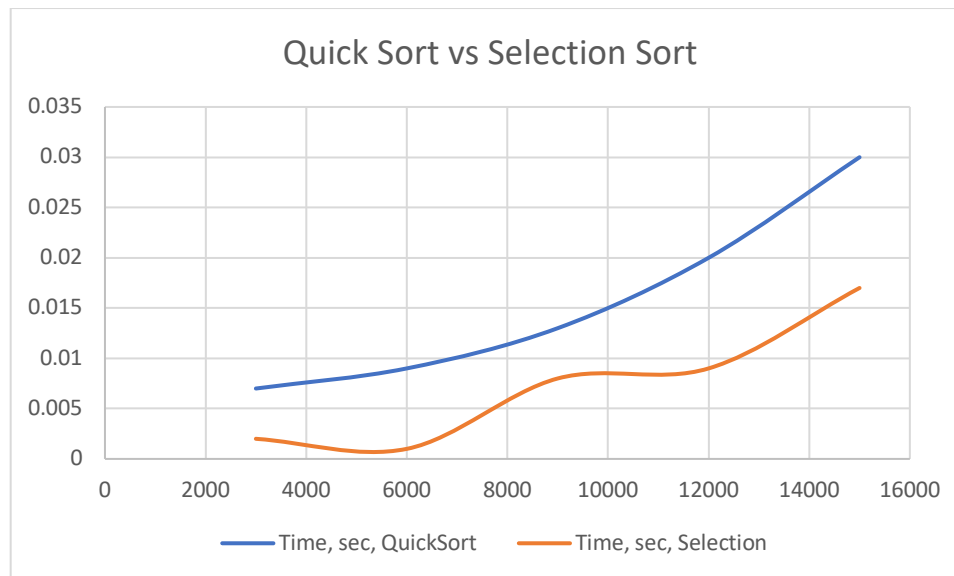

Based on your experimental results, write a conclusion below about which algorithm performed better in terms of time in this experiment, and briefly explain why do you think this is the case:

Quicksort algorithm performed better than insertion sort because it has to partion the vector firsr as to get pivot. Insertion takes longer due to shifting values in vector.

Experiment 2: Comparison of QuickSort and Selection to find the k-th suffix taken in alphabetical order of a given string S. For Experiment 2, use the following command line arguments (shown in column 1):

| Input File, parameter k	Size of S	Time, sec, QuickSort	Time, sec, Selection
chrY_50.txt 1500	3000	0.007	0.002
chrY_100.txt 5000	6000	0.009	0.001
chrY_150.txt 8500	9000	0.013	0.008
chrY_200.txt 100	12000	0.02	0.009
chrY_250.txt 8000	15000	0.03	0.017

Insert your graph for Experiment 2 below.

Based on your experimental results, write a conclusion below about which algorithm performed better in terms of time in this experiment, and briefly explain why do you think this is the case:

Selection sort performed in better terms than quicksort because we knew the starting position of the k-the suffix of the string hence, Selection algorithm completed the task in linear time. Quicksort will first perform sort then provide kth value

Experiment 3: Comparison of Insertion and Selection to sort all the suffixes of a given string S.

Input File	Size of S	Time, sec, Insertion	Time, sec, Selection
chrY_50.txt	3000	0.04	5.46
chrY_100.txt	6000	0.20	22.33
chrY_150.txt	9000	0.05	50.42
chrY_200.txt	12000	0.085	92.98
chrY_250.txt	15000	1.30	153.97

Insert your graph for Experiment 3 below. If you need more space, use more space.
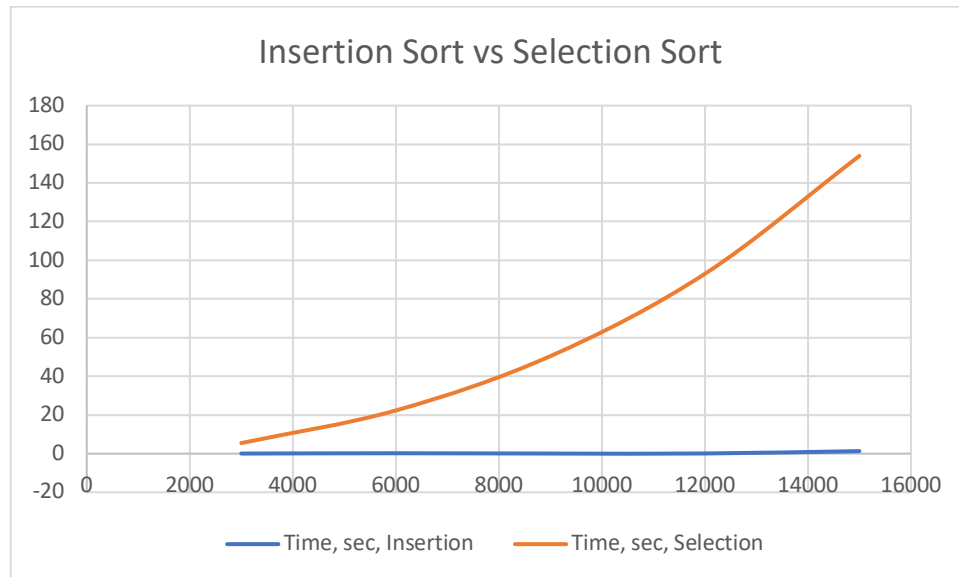
Based on your experimental results, write a conclusion below about which algorithm performed better in terms of time in this experiment, and briefly explain why do you think this is the case:

Insertion sort performed better in terms of time as compared to Selection sort algorithm because we included a for loop hence to sort the elements and placing them is vector took long time. As converse, Insertion sort needed only to swap the element and sort them out so was much faster.