Lab-IX
National Institute of Technology Silchar
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Subject Code: CS-201 | Subject: Data Structures
Semester: 3rd | Department: CSE
Course: B.Tech | Section: A

You have to write the time complexities and space complexities in the lab copies for all questions.

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1. Given an array $A[1 \dots n]$ containing n random numbers where n is a large number. For instance, n=1,000,000. You need to analyze the sorting algorithms for the best, average, and worst case. Write the time (for the best, average, and worst case) and space complexities.

   (a) Compare the best-case scenarios of selection sort, bubble sort, insertion sort, quick sort, and merge sort.

   (b) Compare the average case scenarios of selection sort, bubble sort, insertion sort, quick sort, and merge sort.

   (c) Compare the worst-case scenarios of selection sort, bubble sort, insertion sort, quick sort, and merge sort.

   You populate the array according to the requirement. You need to make tables and figures as given below-

Table 1: The best-case comparison of sorting algorithms

Number of inputs	Selection	Bubble	Insertion	Merge	Quick
1000000	time taken	time taken	time taken	time taken	time taken
2000000	time taken	time taken	time taken	time taken	time taken
3000000	time taken	time taken	time taken	time taken	time taken
4000000	time taken	time taken	time taken	time taken	time taken
5000000	time taken	time taken	time taken	time taken	time taken

Table 2: The average-case comparison of sorting algorithms

Number of inputs	Selection	Bubble	Insertion	Merge	Quick
1000000	time taken	time taken	time taken	time taken	time taken
2000000	time taken	time taken	time taken	time taken	time taken
3000000	time taken	time taken	time taken	time taken	time taken
4000000	time taken	time taken	time taken	time taken	time taken
5000000	time taken	time taken	time taken	time taken	time taken

Table 3: The worst-case comparison of sorting algorithms

Number of inputs	Selection	Bubble	Insertion	Merge	Quick
1000000	time taken	time taken	time taken	time taken	time taken
2000000	time taken	time taken	time taken	time taken	time taken
3000000	time taken	time taken	time taken	time taken	time taken
4000000	time taken	time taken	time taken	time taken	time taken
5000000	time taken	time taken	time taken	time taken	time taken

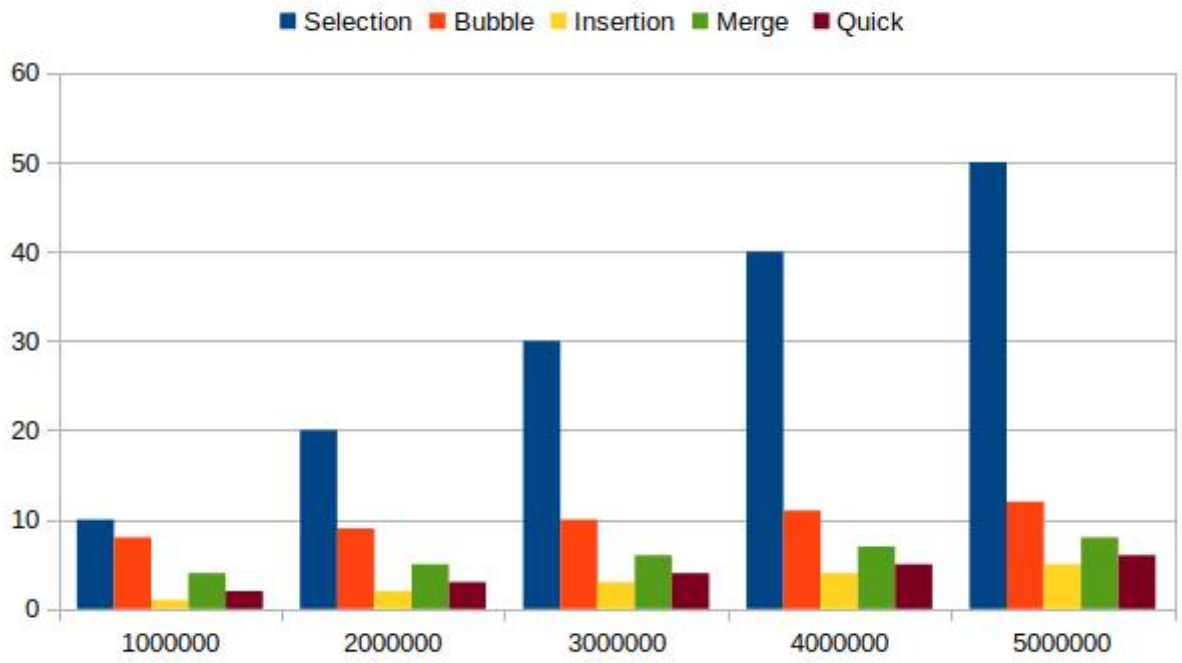

Figure 1: Example of chart.