Name: Suraj Prakkash Nair
UCID: 2021510037
Exp 1 : To implement Divide and Conquer method
Subject : Design and Analysis of Algorithm

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Report :-

→ Functions used :-

3 functions were made to implement 3 sorting algorithms namely, Merge sort, Quick sort, Heap sort.

→ Implementation in code :-

- An input array of size '10,000' is populated with random numbers using rand() function.
- 3 arrays are repeatedly populated with elements (50, 100, 150, ..., 10,000) from our input array. These arrays are named as arrMerge, arrQuick, arrHeap. This task is performed in a loop until all random elements from the input array are dealt with.
- A table of values are printed on the console consisting of the following columns : Input size, Time taken by Merge Sort, Time taken by Quick Sort, Time taken by Heap Sort.
- This table of values are taken in a .CSV file and used to plot a graph of input size Vs time taken.

→ Conclusion from graph :-

- It is evident from the graph that Heap sort is the slowest for datasets of all sizes. The only advantage of using Heap Sort is that it does not use massive recursion or auxiliary array
- For small to medium size inputs, Merge Sort clearly wins over Quick Sort (for random data)
- For large inputs, Merge and Quick sort are competing with each other and show similar performance.
- Note that the frequent spikes in the graph denote that for those set of input values that satisfy worst case condition of the particular sorting algorithm.