**DSA - Experiment 2**

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|  | **Aim:** To implement and analyze Merge sort and Quick sort.  **Merge Sort**  **Theory:**  The Merge Sort algorithm is a sorting algorithm that is based on the Divide  and Conquer paradigm. In this algorithm, the array is initially divided into two equal halves and then they are combined in a sorted manner.  **Time Complexity:**  O (N log(N)), Sorting arrays on different machines. Merge Sort is a recursive algorithm and time complexity can be expressed as following recurrence relation.  *T(n) = 2T(n/2) + θ(n)*  **CODE:**  **Text  Description automatically generated**  **A screenshot of a computer  Description automatically generated with medium confidence**    **OUTPUTS:**    **Text  Description automatically generated** |
|  | **Quick sort**  **Theory:**  Quicksort is a Divide and Conquer algorithm. It picks an  Like Merge Sort  element as a pivot and partitions the given array around the picked pivot.  There are many different versions of quicksort that pick pivot in different  ways.   1. Always pick the first element as a pivot. 2. Always pick the last element as a pivot (implemented below) 3. Pick a random element as a pivot. 4. Pick median as the pivot.   **Time Complexity :**  **T(n) = T(k)+T(n-k-1)+O(n)**Where k is no. of elements that are smaller than pivot.  **CODE:**  **Text  Description automatically generated**  **Text  Description automatically generated**  **OUTPUTS:**      **Text  Description automatically generated**  **Conclusion:** Thus insertion and selection sort were implemented. |