Experiment 3

Shashwat Shah
60004220126
TYBtech Comps B

Aim : Implement Quick Sort using Randomised Algorithm and perform complexity analysis of the solution.

Theory : Quick sort is a popular sorting algorithm that chooses a pivot element and sorts the input list around that pivot element.

Randomised quicksort is designed to decrease the chances of the algorithm being executed in the worst case time complexity of $O(n^2)$. The worst case time complexity of quick sort arises when the input given is an already sorted list leading to a $n(n-1)$ comparison.

There are two ways to randomize the quicksort.

→ Randomly Shuffling the input :-
Randomization is done on the input list. So that the sorted input is jumbled again, which reduces the time complexity. However this is not usually performed in the randomized quick sort.

Randomly choosing the pivot element : Making the pivot element a random variable is commonly used method in the randomized quick sort. now even if the input is sorted, the pivot is chosen randomly so the worst case time complexity is avoided.

Conclusion : The implementation of quick sort using the randomized algorithm ensures better performance by reducing the likelyhood of worst case scenarios, enhancing reliability.