ALGORITHM LAB

Divide and Conquer Method-I

PROGRAM EXERCISE-5

Lab. Exercise(LE):

5.1) Write a program to search an element key in an array of n integers using **Binary Search** algorithm that uses **divide and conquer** technique. Find out the best case, worst case and average case time complexities for different values of n and plot a graph of the time taken versus n. The n integers can be generated randomly and key can be chosen randomly or any element in the array or middle or first or last element of the array depending on type of time complexity analysis.

5.2) Write a program to use **divide and conquer** method to determine the time required to find the **maximum and minimum element** in a list of n elements. The data for the list can be generated randomly. Compare this time with the time taken by straight forward algorithm or brute force algorithm for finding the maximum and minimum element for the same list of n elements. Show the comparison by plotting a required graph for this problem.

Home Exercise(HE):

5.3) Write a program that uses a divide-and-conquer algorithm/user defined function for the exponentiation problem of computing $\mathbf{a^n}$ **where** $\mathbf{a > 0}$ and n is a positive integer. How does this algorithm compare with the brute-force algorithm in terms of number of multiplications made by both algorithms?