Lab Exercise 8 – Selection Sort and Quick Sort Algorithm

Question 1

Consider the selection sort algorithm given below. Selection sort algorithm sorts n numbers stored in array A by first finding the smallest element of A and exchanging it with the element in A[1]. Then find the second smallest element of A, and exchange it with A[2]. Continue in this manner for the first n - 1 elements of A.

SELECTION-SORT*(A)*

1. $n = A.length$
2. for $j = 1$ to $n - 1$
3.   *smallest* $= j$
4.   for $i = j + 1$ to n
5.   if $A[i] < A[smallest]$
6.   *smallest* $= i$
7.   exchange $A[j]$ with $A[smallest]$

Write a program to sort a set of numbers using selection sort algorithm

Question 2

    a. Write a program to read a set of numbers and store them on an array.

    b. Write function named as partition to divide the array into two parts according to the partition point.

PARTITION(A, p, r)

1 $x = A[r]$
2 $i = p - 1$
3   **for** $j = p$ **to** $r - 1$
4   **if** $A[j] \leq x$
5   **then** $i = i + 1$
6   exchange $A[i]$ wih $A[j]$
7   exchange $A[i + 1]$ with $A[r]$
8 **return** $i + 1$

    c. Call the function from the main program and display the array.

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d. Modify the program to sort the elements of the array using quick sort algorithm.

> **QUICKSORT** (A,*p,r*)
> 1   **if** p < r
> 2   q = **PARTITION**(A,*p,r*)
> 3   **QUICKSORT** (A,*p,q*-1)
> 4   **QUICKSORT** (A,*q+1,r*)