SLIIT
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BSc (Hons) in Information Technology
Year 2
Data Structures and Algorithms – IT2070

Lab Exercise 8 – Selection Sort and Quick Sort Algorithm 2023

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] ≤ 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.

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)
```