ACADEMY OF TECHNOLOGY

Lab Assignment (Assignment 20)

Paper name: Data Structure and Algorithm

Code: PCC-CS391 **Semester: 3^{rd}**

Discipline: CSE **Time: 2 Hours**

Date: December 9, 2020

1. Write a C or C++ program to implement ***Quick*** Sort using ***Hoare*** Partition algorithm for

   A. First element as pivot.

   B. Last element as pivot.

Algorithm 1: PARTITION $(arr[], low, high)$

```
1  left := low − 1;
2  right = high;
3  pivot = arr[high];
4  while left < right do
5  |   do left := left + 1; while arr[left] < pivot;
6  |   do right := right − 1; while right ≥ 0 and arr[right] > pivot;
7  |   if left < right then swap arr[left], arr[right];
8  end
9  swap arr[high], arr[left];
10 return left;
```

   C. Median as pivot.

Algorithm 2: PARTITION $(arr[], low, high)$

```
1  left := low − 1;
2  right = high;
3  pivot = arr[⌊(low+high)/2⌋];
4  while left < right do
5  |   do left := left + 1; while left ≤ high and arr[left] < pivot;
6  |   do right := right − 1; while right ≥ low and arr[right] > pivot;
7  |   if left < right then swap arr[left], arr[right];
8  end
9  return right;
```

Algorithm 3: QUICK-SORT $(arr[], low, high)$

```
1  if low < high then
2  |   j :=PARTITION(arr, low, high);
3  |   QUICK-SORT (arr, low, j);
4  |   QUICK-SORT (arr, j + 1, high);
5  end
```

2. Write a C or C++ program to implement ***Quick*** Sort using ***Lomuto*** Partition algorithm.