Faculty of Engineering, University of Jaffna

Department of Computer Engineering

EC4070: Data Structures and Algorithms

Lab – 02

Design and Analysis of Recursive Algorithms

Date: 13th November 2020 **Duration: 3 hour**

1. Identity. **[40 Marks]**

Given an array a[ ] of N distinct integers (positive or negative) in ascending order, devise an algorithm to find an index i such that a[i] = i if it exists. Hint: Use a recursive algorithm to solve the problem.

Implement your algorithm using Java which takes n elements integer array as user input and displays the correct output. You can assume the input is always in ascending order.

2. Finding common elements **[60 Marks]**

Given two arrays of integers, design an algorithm to print out all elements that appear in both lists. The output should be in sorted order. Assume the first array has m integers and the second has n integers where m is much less than n. Your algorithm should run in **n * log m** time.

Hint: Sort and binary search.

Instructions:

- Write down the algorithms for both questions in given answer sheets. Algorithm will be evaluated based on efficiency, correctness and readability. Name the file as 201x_E_xxx_L2_answer and add it as a pdf file in submission.
- Implement Java programs using best coding practices.
- Create a zip file named 201x_E_xxx_L2 which contains the pdf file and Java programs for question 1 and 2.
- Upload the zip file on/before given deadline via team.