LANGARA COLLEGE

DEPARTMENT OF COMPUTING SCIENCE AND INFORMATION SYSTEMS

CPSC 1160 - ALGORITHMS AND DATA STRUCTURES I

Assignment 06 – Lab 06

October 26, 2017

Instructions

- This assignment is worth 10 points, and is due on November 2 at 04:00 PM.
- All the program files (.cpp and .h files) are required to be put in a folder named Lab06; the whole folder then should be submitted as a single zipped file on D2L.
- Analysis of your algorithms is required to be provided in separate document files included in your submission.

Question 1 [5 points]

Complement the IntegerArray ADT of the assignment 4 by adding the following functionalities:

1) A sort function to sort the elements of the array in ascending or descending order; both options must be available to the client code. Use the Bubble Sort algorithm for this function.

2) Another sort function to do sorting using the following algorithm:

    a. For each element of the array, first find the index corresponding to its correct location in the sorted array.

    b. Insert the element into a temporary array at the calculated index.

    c. Repeat the above steps to insert all the elements of the array into the temporary array.

    d. Copy the temporary array back into the original array.

3) A search function to look for a particular element in the array using the Linear Search algorithm. This function can be called for either of these two reasons: finding the first occurrence of the element in the array or finding all the occurrences of the element.

4) Another search function to search an element in the array using the Binary Search algorithm; this function stops seeking as soon as the element is found.

Question 2 [5 points]

Provide a detailed analysis on the time and the memory complexity of the above functions, show your results by time and space complexity functions, and utilize the complexity functions to compare the sort and search functions you implemented in Question 2.