Lab 1
EC4070: Data Structures and Algorithms
Chapter 1: Running time and Complexity
Duration: 3 Hour
Array and Searching

Create an array and access the array elements.
Major array operations: insertion, deletion and searching.
Searching algorithms

1. Creating an array and access the elements (**20 Marks**)
   (a) Create an array with size of 20.
   (b) Read elements to this array.
   (c) Interchange ith element with jth element. You are expected to read the i and j values.
   (d) Print the kth element of the array. Read the value for k.
   (e) Delete the kth element.
   (f) Read a new element and insert it as the last element of the array.
   (g) Read an element (one element in the array and another one which is not in the array) and search for this item in your array. If you found it in the array, print the index otherwise print an appropriate message.
2. Object oriented programming. Change the above into OOP.(**40 Marks**)
   (a) Create a class array with all the required variables.
   (b) Create the following methods with required parameters.
      i. Read array elements.
      ii. Print the array elements.
      iii. Interchange ith element with jth element.
      iv. Print the array element at the given index.
      v. Delete the array element at the given index
      vi. Insert a given element at the given index.

vii. Search for an element in the array.

(c) Properly call them in the main method.

3. Searching and sorting algorithms. Implement the following searching and sorting algorithms and test them in your array. Follow the object oriented concept. (**40 Marks**)

   (a) Linear search

   (b) Bubble sort

   (c) Insertion sort

   (d) Selection sort