**CS 421 Project1 (150 pts Due on September 29, 2023, by 11:59)**

**Objective**: Determine the complexity of different algorithms.

1. **YOU MUST IMPLEMENT ALL THREE ALGORITHM and SUBMIT THEM. I WILL TEST ALL OF THE ALGORITHM.**
2. **YOUR ALGORITHMS MUST EITHER READ THE NUMBERS FROM FILE OR RANDOMLY GENERATE THE ARRAY ONCE THE SIZE IS DETERMINED.**
3. **YOU MUST HAVE A SEPARATE DOCUMENT FOR**

**CORRECNESS JUSTIFICATION**

**COMPLEXITY ANALYSIS**

**WHICH ALGORITHM IS BETTER WHY**

1. **SUBMISSION OF THE PROJECT IS TO THE BLACKBOARD:**

**Create a folder named LastFirstProject1.**

**Place all the files and codes into the folder.**

**Zip your folder.**

**Submit to the blackboard.**

1. **IF ANYONE OF THE ABOVE CONDITIONS DO NOT MEET, YOU WILL LOSE %25 of YOUR GRADE**

**Problem**: Suppose you are given an array, with size n, of integers. The size of array *n* is a positive number. Give three different algorithms to find the maximum element of the given array.

1. (20 pts) Algorithm 1: Brute-force algorithm. That is, an algorithm that finds the largest element by exhausted search.
2. (20 pts) Algorithm 2: Divide-and-conquer, that is, recursive algorithms.
3. (20 pts) Algorithm 2: Another divide-and-conquer, that is, recursive algorithms which must be different than the algorithm in 2.

Once you have implemented all these three algorithms:

1. (45/15) Justify(proof) that your algorithms are correct.
2. (30 pts) Determine the complexity of these three algorithms.
3. (15 pts) Is there an algorithm among these three that is the most efficient? Why?