**CS4335 Tutorial 8 (hand-in to Assignments/tutorial8, deadline Nov 1, 2021)**

**The question is Q5 of midterm**

**Question 5. (15 points)**

Given an array of n ≥ 2 **distinct** integers (i.e., no two integers are the same) sorted in ascending order, say [x(1),...,x(n)], we want to find the absolute minimum *difference between the x(i) and i*. For example, for *x = [-10, 9, 10, 12, 13, 16] ,* the minimum *difference d =*|*x(2)−2| =* |*9−2| = 7*.

**(a)** (**5 points)** Use a linear time algorithm to solve the problem.

**(b)** (**5 points**) Use a divide and conquer approach the solve the problem. The running time should be O(logn).

**(c)** **(5 points)** Set up and solve a recurrence equation for part (b) to estimate the running time of your algorithm. Prove that the running time of your algorithm is O(logn).

**Hint:** The difference will first decrease and then increase.