Homework #2, CpSc 3120, Fall 2022
Total 30 points

Question 1 (6 + 4 = 10 points)

(a) Hannah gives clues about her six-digit secret number:

a. Clue 1: It is the same number if you read it from right to left.
b. Clue 2: The number is a multiple of 9.
c. Clue 3: Cross off the first and last digits. The only prime factor of the remaining four-digit number is 11.

What is Hannah's six-digit number?

(b) The only way that 10 can be written as the sum of 4 different counting numbers is 1 + 2 + 3 + 4. In how many ways can 15 be written as the sum of 4 different counting numbers? Enumerate those.

Question 2 (8 + 12 = 20 points)

Problem: Given an array A[], if i < j and A[i] > A[j], then the pair (i,j) is called a reversal of the array A. [Example: Input: arr[] = {8, 4, 2, 1}, Output: 6; Why? Because the given array has 6 reversals: (8, 4), (4, 2), (8, 2), (8, 1), (4, 1), (2, 1)] Provide a detailed algorithm pseudocode (and its complexity analysis) to compute the total number of reversal pairs in any arbitrary array of size n. Then, provide an efficient algorithm pseudocode (and its complexity analysis) [**8 points for a simple-minded algorithm; the other 12 points for the most efficient algorithm with proper justification and complexity analysis**]