**Name:** CENSORED

**Assignment:** HW1

**Class:** COMP-4200

**Due Date:** 1/17/20

Problem 1:

1. There is no integer *n* such that *n* = *n* + 1. This set could go up to infinity but not include infinity since it is not an integer, and since there is no integer that can fit this description up to infinity, it is informally true that there cannot be an integer that fits this description; thus, this will result in an empty set.
2. This set would only contain binary strings that are the same backwards and forwards (i.e., strings like 0110 or 1001001, which are referred to as “palindromes”), and since there is no limit to how large these strings may be, the set would have infinite members that are palindromes.
3. Domain: {(1, 6), (1, 7), (1, 8), (1, 9), (1, 10), (2, 6), (2, 7), (2, 8), (2, 9), (2, 10), (3, 6), (3, 7), (3, 8), (3, 9), (3, 10), (4, 6), (4, 7), (4, 8), (4, 9), (4, 10), (5, 6), (5, 7), (5, 8), (5, 9), (5, 10)}

Range: {10, 10, 10, 10, 10, 7, 8, 9, 10, 6, 7, 7, 8, 8, 9, 9, 8, 7, 6, 10, 6, 6, 6, 6, 6}

1. Since f(4) = 7, we would be looking at the value of g(4, 7), which we can determine to be 8 based on the provided table.

Problem 2:

1. (1) Base Case: If n = 1, 1/(i(i + 1)) = ½ <==> n/(n + 1) = 1/(1 + 1) = ½

(2) Induction Hypothesis: Assume that the statement holds when n <= k, i.e., 1/(i(i + 1)) = k/(k + 1).

(3) Inductive Step: 1/(i(i + 1)) = 1/(i(i + 1)) + 1/(k2 + 3k + 2) = k/(k + 1) + 1/(k + 2)(k + 1) = (k2 + 2k + 1)/(k + 2)(k + 1) = (k + 1)(k + 1)/(k + 2)(k + 1) = (k + 1)/(k + 2). Now we can conclude that when i = k + 1, the proposition we are trying to prove holds, because under this case, n <= k + 1 and n + 1 <= k + 2. Therefore, the proposition holds for all integers n.

1. (1) Base Case: If n = 1, 13 = 1 <==> [n(n + 1)/2]2 = [2/2]2 = 1

(2) Induction Hypothesis: Assume that the statement holds when n <= k, i.e., i3 = [k(k + 1)/2]2.

(3) Inductive Step: i3 = i3 + (k + 1)3 = [k(k + 1)/2]2 + (k + 1)3 = (k4 + 2k3 + k2)/2 + k3 + 3k2 + 3k + 1 = k4/2 + 2k3 + 7k2/2 + 3k + 1 <==> [(k + 1)(k + 2)/2]2. Now we can conclude that when i = k + 1, the proposition we are trying to prove holds, because under this case, n <= k + 1 and n + 1 <= k + 2. Therefore, the proposition holds for all integers n.