Section 09 (Part A): CFGs, Relations and FSMs

1. CFGs

(a) All binary strings that end in 00.

(b) All binary strings that contain at least three 1's.

(c) All strings over {0,1,2} with the same number of 1s and 0s and exactly one 2.
Hint: Try modifying the grammar from lecture for binary strings with the same number of 1s and 0s. (You may need to introduce new variables in the process.)

2. Good, Good, Good, Good Relations

In each part of this problem, we define a relation R on this set. For each one, state whether R is or is not reflexive, symmetric, antisymmetric, and/or transitive. If a relation does not have a property, state a counterexample.

(a) Consider the relation $R = \{(x, y) \ : \ x = y + 1\}$ on $\mathbb{N}$.

(b) Consider the relation $R = \{(x, y) \ : \ x^2 = y^2\}$ on $\mathbb{R}$.