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1. Question 1

   (a) $S \to 00S1$

   $S \to 1S00$

   The first two are clear rules of the language. When adding a single 1, you must also add two 0's

   $S \to SS$

   Concatenating two existing strings in the grammar will also produce a vaild string. Both have the correct relationship between 1's and 0's, so the relationship does not change when they are combined

   $S \to 0S1S0$

   The forth rule allows the concatenation of two existing strings, and adding two 0's and a 1, allowing for "random" placement of 1's and 0's.

   $S \to \lambda$

   The fifth rule allows for the termination of a derivation

   (b)

$S \to 00S1$	Rule 1
$00S1 \to 00[1S00]1$	Rule 2
$00[1S00]1 \to 00[1[0S1S0]00]1$	Rule 4
$00[1[0S1S0]00]1 \to 001010001$	Rule 5 for both S