1. Markov Chain Terminology Test
For each of the following Markov chains, determine if it is (a) periodic and/or (b) reducible.
2. **Number of Ones**

In this problem, we will revisit dice-rolling, except with conditional expectation.

(a) If we roll a die until we see a 6, how many ones should we expect to see?

(b) If we roll a die until we see a number greater than 3, how many ones should we expect to see?

(c) We add $r$ red marbles, $b$ blue marbles and $g$ green marbles to the same bag. If we sample balls, with replacement, until we get 3 red marbles (not necessarily consecutively), how many blue marbles should we expect to see?