

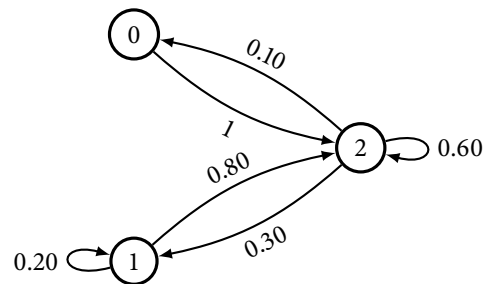
Solutions to Problem 1.

For the Markov property to hold, the next toothpaste brand that a customer purchases must only depend on the customer's current toothpaste brand. This may not be reasonable, since brand loyalty usually goes beyond one tube.

For time stationarity to hold, the probabilities of moving between toothpaste brands must be constant over time. This also may not be reasonable, depending on the time horizon, since tastes tend to change over time.

Solutions to Problem 2.

- **State space.** $\mathcal{M} = \{0, 1, 2\}$. Each state corresponds to the number of working computers at the beginning of the day.
- **Time step.** Each time step corresponds to one day (from the beginning of one day to the beginning of the next day).
- **State visited in the n th time step.** S_n = the number of working computers at the beginning of the n th day.
- **One-step transition probabilities.**



For state 1, note that if 1 computer is working, then 1 computer is being repaired and will return the next day.

- **Initial state probabilities.** $p_0 = 0, p_1 = 0, p_2 = 1$.