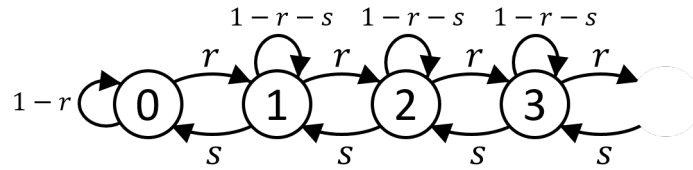


Extra problem: Here is the Markov chain we saw at the end of class on Monday:



This chain tracks the number of jobs in a single-server system in which, at each timestep, with probability r there is an arrival and no departure, and with probability s there is a departure and no arrival.

(a) Find the stationary distribution of the number of jobs in this system. Do this by setting up and then solving the stationary equations. (At one point there will be an infinite sum that you need to solve. If you don't remember the closed form for this sum, feel free to use your favorite math software to compute it.)

(b) What is ρ , the utilization of this server?

(c) Let N denote the number of jobs in the system. Find $E[N]$, and express it in terms of ρ . (Again, feel free to use math software to compute the infinite sum that will come up.)

Note: This problem is solved in the textbook. Please solve it on your own, without looking in the book for the solution. The point is to practice, not to write down the right answer.