BSM Course on Markov Chains and Dynamical Systems, Spring 2024 **Quiz** #5, April 4; **NAME:**

| 1. | The Megasoft company gives each of its employees the title of programmer (P) or project manager (M). In any given year 70% of programmers remain in that position, 20% are promoted to project manager and 10% are fired (state X). 95% of project managers remain in that position while 5% are fired. How long on the average does a programmer work before they are fired? |
|----|---|
| | |
| | |
| | |

2. Let Y be a random variable with distribution $\mathbb{P}(Y=0)=0.2$, $\mathbb{P}(Y=1)=0.4$ and $\mathbb{P}(Y=2)=0.4$. Consider the branching process with offspring distribution Y. What is the probability of extinction?