

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?