

Alice decides that she wants to keep re-taking AI every semester for the rest of eternity (she *really* likes AI). We're interested in modeling whether she passes the class or not as a Markov chain. Suppose that in semester  $t$  she passes the class; then in semester  $t + 1$  she passes the class with probability 0.8 (maybe she gets bored and forgets to pay attention). On the other hand, if she doesn't pass in semester  $t$  then she'll pass with probability 0.4.

1. Suppose that in semester  $t = 0$  Alice passes the class with probability 0.5. Compute the probability that she passes in semester  $t = 1$  and semester  $t = 2$ .
2. Compute the stationary distribution of this chain.