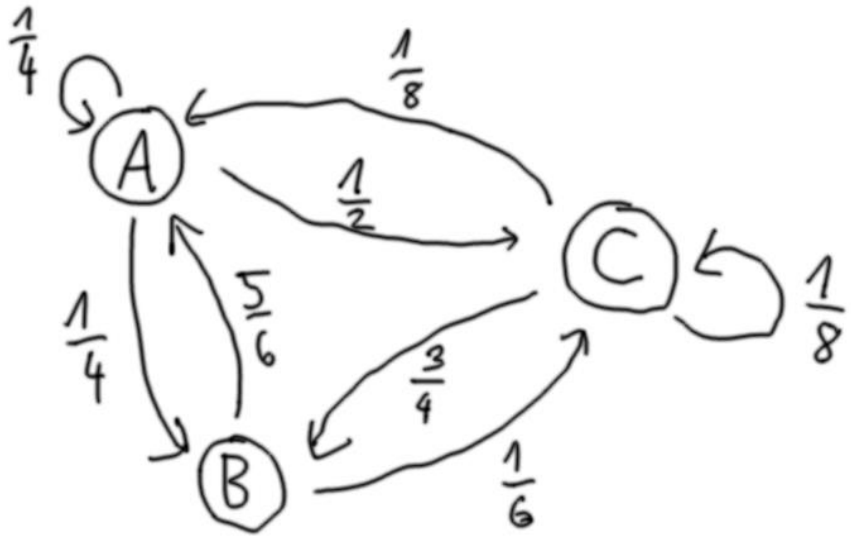
Tasks Peer-Teaching 22.06

Example Problem 1

Imagine that a supernation X is constantly at war, every four years with a different enemy of the set S = {A,B,C}. (inspired by 1984 with one nation more) The Markov chain graph of the transition probabilities is shown below



a) What is the transition matrix?
b) If the initial probability of being at war with A is $P(X\_1=A)$=1/6 and P(X_1=B)=1/2, what is the probability $P(X\_1=C, X\_2=B,\ X\_3=A, X\_4=A)$?

Example Problem 2

You are in a casino observing a gambler starting with 50$. He proclaims that he will be playing either until he has 75$ or is out of money. Every round he bets 25$, if he wins, he doubles his wager otherwise he loses the whole wager.

Draw the state diagram and compute the transition matrix assuming a fair (50:50) game.

How will the matrix look after the second game? And after ∞ games (try to guess a general formula)?

How does the matrix change for an unfair game (25:75)? How will it look after a second game?

Example problem 3

Calculate the transition matrix for the sequence AGGCTACTAGCTAGCATCGAC.