

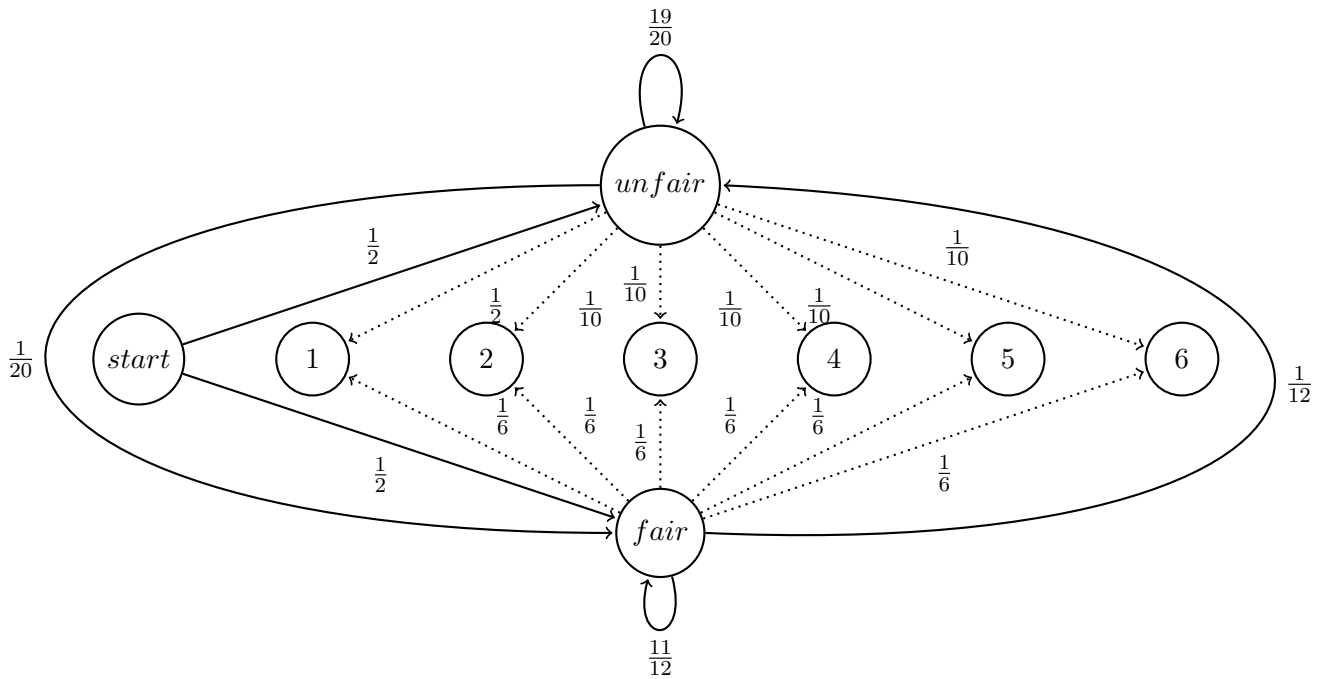
CS 361 Spring 2018

Homework 11

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a)

I approached the first problem by drawing a FSM with two states. This drawing is provided below along with the transition probabilities and emission probabilities. After modeling this using HMM's Multinomial class, I was able to sample this distribution 100000 times. We see that the probability that the emitted probability is a 1 is approximately 0.193, which is slightly higher than $\frac{1}{6}$. The other values had probability slightly below $\frac{1}{6}$, which is attributed to the lower probability on the unfair die.



b)

For this problem, I simulated draws of 10, 100, 1000, 10000, each 10 times and used `MulinomialHMM.decode` to predict what the original sequence states were given the sample that I drew. Once I had the predicted states and the true states, I could just count in how many places they varied. I recorded this for each of the 10 epochs and then averaged the accuracies. It looks like sampling a larger number of points did not help accuracy, as it was almost a constant 0.915 throughout all epochs of the simulation.