MATH 1105 - FALL 2008 - 11-14-08
SECTION 2
IN-CLASS PROBLEMS

(1) Consider the following alteration to the Ehrenfest Model. There are two urns and 6 balls totals in the two urns. In each trial of the experiment, 2 balls are chosen at random and removed from the urn that they are in and placed into the other urn (note that the two balls do not have to be in the same urn.) What is the transition matrix for this Markov chain?

(2) A machine at Cornell's Equine Drug Testing Laboratory breaks frequently. If this machine is broken at the beginning of a day, the probability that a repairperson will come and fix the machine that day and the machine is still working at the end of the day is .6. If the machine is working at the start of a day, the probability that it will break sometime during the day and remain broken through to the end of the day is .1. What is the transition matrix for the experiment of the machine's functionality, where one trial is given by using the machine for one day? Draw the transition diagram. If the machine is working at the beginning of the day on Monday, what is the probability that it will be working at the end of the day on Friday?

(3) Consider the experiment where you are given a number and in each trial subtract 2 from the number with probability .2, subtract 1 with probability .3, add 1 with probability .25, and add 2 with probability .25. Further, the number is forced to be less or equal to five and greater than or equal to 0 at the completion of each trial. To accomplish this, if the number resulting from adding or subtracting 1 or 2 is ever less than 0, add 6 to it and if the number is ever greater than 5, subtract 6 from it. What is the transition matrix for this experiment? If your are given the number 4, what is the probability that after 2 trials you will end up with the number 3? the number 0? the number 1?