Math/Stat 251 Fall 2015
Class Exercises from September 25, 2015

Problem 1. Suppose that a pair of standard fair six-sided dice are tossed and the number of pips on the upmost face of each die is observed.

(a) Carefully list the sample space S for this experiment, and give a concise formula for $\mathbf{P}(A)$ for any event A.

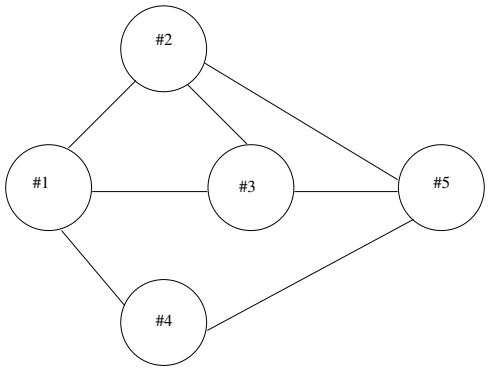
(b) If A is the event that the first die shows 2 and B is the event that the sum of the dice is 8, are the event A and B independent?

(c) If A is the event that the first die shows 3 and B is the event that the sum of the dice is 8, are the event A and B independent?

(d) If A is the event that the first die shows 3 and B is the event that the sum of the dice is 7, are the event A and B independent?

Problem 2. Two dart players throw alternatively at a dartboard and the player to hit the bullseye first wins. On each of their throws, player A has probability p_A of hitting the bullseye and player B has probability p_B of hitting the bullseye. Assume that the results of different throws are independent. If player A throws first, calculate the probability that player A wins.

Problem 3. Franklin the Frog lives on Wascana Lake. Each morning after he wakes up and eats his breakfast of flies, Franklin decides to hop to a neighbouring lily pad chosen at random. Suppose that the configuration of lily pads in Wascana Lake is as shown in the following diagram.



Assume when answering the following two questions that Franklin wakes up on lily pad #1 on day 1 .

(a) Determine the probability that Franklin wakes up on lily pad #5 on day 3.

(b) Suppose that Franklin wakes up on lily pad #5 on day 3. Determine the probability that he woke up on day 2 on lily pad #4.

Problem 4. In transmitting streams of binary data, a communication system changes one quarter of all 0s to 1s and one third of all 1s to 0s. If 40% of the data transmitted are 0s and 60% are 1s, what is the probability that a 0 received was actually a 1?