Stat 330 (Spring 2018): Homework 3

Due: January 31, 2018

Show all of your work, and *please* staple your assignment if you use more than one sheet. Write your name, the course number and the section on every sheet. Problems marked with * will be graded and one additional randomly chosen problem will be graded.

1. A computer has a dual-core processor. At any time, the probability that each of the processors are active is

		Processor 2		
		In Use	Not In Use	
Processor 1	In Use	0.50	0.15	0.65
	Not In Use	0.25	0.10	0.35
		0.75	0.25	

   Let A be the event that processor 1 is in use and B be the event that processor 2 is in use.

   (a) Calculate $P(A|B)$.

   (b) Are the events A and B independent? Why or why not?

   (c) Calculate $P(B|A)$.

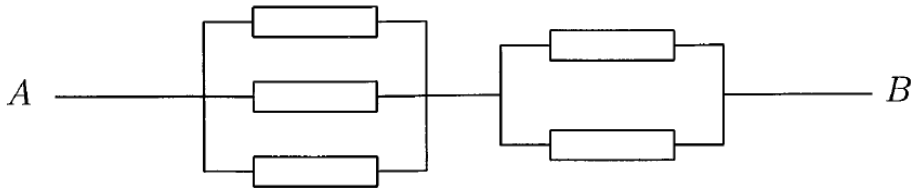
   (d) Show that $P(A|B)P(B) = P(B|A)P(A)$.

2. Suppose we have two boxes; Box 1 contains 4 defective and 16 non defective light bulbs. Box 2 contains 1 defective and 1 non defective light bulb. We roll a fair die one time. If we get a 1 or a 2, we select a bulb at random from box 1. Otherwise we select a bulb from box 2. What is the probability that the selected bulb will be defective?

3. * In a multiple choice exam, a student does know the answer or he guesses. Assume p is the probability that the student does know the answer, and $1-p$ is the probability that the student guesses the answer. The student (who guesses) can have the right answer with probability $\frac{1}{m}$ when m is the total number of answers per question. Find the probability that the student does know the answer conditional on giving the right answer?

4. Suppose I have 2 coins C_1 and C_2 such that the probability that C_1 flips a head is 0.25 and the probability that C_2 flips a head is 0.75. Suppose I *randomly* choose one of the coins and flip it twice. If both flips result in heads, what is the probability that C_2 was the coin chosen?

5. In the following system, each component fails with probability 0.3 *independently* of other components. Compute the system's reliability.



6. * Calculate the reliability of each system show below, if components A, B, C, and D function properly with probabilities 0.9, 0.8, 0.7, and 0.6, respectively.