ECE316: Tutorial 5 (June 7, 2017)

1 Problems

1. Show that, for any events E and F, $P(E|E \cup F) \geq P(E|F)$.

2. Show that if $P(A|B) = 1$, then $P(B^c|A^c) = 1$.

3. There is a 60 percent chance that event A will occur. If A doesn't occur, then there is a 10 percent chance that B will occur. What is the probability that atleast one of the events A or B occur?

4. Maria will take two books with her on a trip. Suppose that the probability that she will like book 1 is .6, the probability that she will like book 2 is .5, and the probability that she will like both books is .4. Find the conditional probability that she will like book 2 given that she did not like book 1?

5. If A flips $n+1$ and B flips n fair coins, show that the probability that A gets more heads than B is $\frac{1}{2}$.

6. Suppose we have 10 coins such that if the i-th coin is flipped, heads will appear with probability $\frac{i}{10}$, $i = 1, 2, \ldots, 10$. When one of the coins is randomly selected and flipped, it shows heads. What is the conditional probability that it was the fifth coin?

7. Show that if A and B are two independent events, then the probability of occurrence of at least one of A and B is given by $1 - P(A^c)P(B^c)$.

8. Independent flips of a coin that lands on heads with probability p are made. What is the probability that the first four outcomes are
   (a) H, H, H, H?
   (b) T, H, H, H?
   (c) What is the probability that the pattern T, H, H, H occurs before the pattern H, H, H, H?