550.420 Intro to Probability - Spring 2017 **Homework #01**
Due: in lecture *Friday, Feb. 10.*

From the textbook (Ross, 9th edition)
Chapter 2 Problems (pages 48-52): problems 1, 2, 3, 4, 5, 8
Chapter 2 Theoretical problems (pages 52-55): problems 6, 7, 8(just part (a) for now), 10, 12, 13.

Additional problems:

A.1.1. Let A be the event that a person is male, B that the person is under 30, and C that the person speaks French. Describe in symbols ($\cup, \cap$, and ^{c}) the following:
(a) a male over 30
(b) a female who is under 30 and speaks French
(c) a male who is either is under 30 or speaks French.

A.1.2. Consider the experiment of watching the days trading activity on a stock market, and consider the following events: A the stock market goes up by at least 2% at the end of the days trading; B the stock market goes up by at least 1% at the end of the days trading; and, C the number of shares traded in the days trading exceeds the previous day. A speculator makes the following claims: $P(A) = .5$, $P(B) = .8$, $P(C) = .4$, $P(B^c \cap C) = .3$, and $P(A^c \cap C) = .35$. Are the claims made by the speculator consistent with a probability law? Please justify your assertion.
Hint: Do you see that $A \subseteq B$? Now a Venn diagram can help with this problem.

A.1.3. (a) Using Venn diagrams, prove the following version of DeMorgan's Law: If A and B are events in a sample space, then $(A \cup B)^c = A^c \cap B^c$.
(b) Explain why the law given in part (a) in this problem must remain true for three sets, namely, $(A \cup B \cup C)^c = A^c \cap B^c \cap C^c$; and in general, why it must hold true for n events $A_1, A_2, \ldots, A_n$.