EE381 Homework #2

1) A pair of dice is loaded. The probability that a 4 appears on the first die is 2/7, and the probability that a 3 appears on the second die is 2/7. Other outcomes for each die appear with probability 1/7. What is the probability of 7 appearing as the sum of the numbers when the two dice are rolled?

2) A bit string of length four is generated at random so that each of the 16 bit strings of length four is equally likely. What is the probability that it contains at least two consecutive 0s, given that its first bit is a 0? (assuming that 0 bits and 1 bits are equally likely)

3) A fair die is tossed twice. Find the probability of getting a 4, 5, or 6 on the first toss and a 1, 2,3, or 4 on the second toss.

4) Suppose E is the event that a randomly generated bit string of length four begins with a 1 and F is the event that this bit string contains an even number of 1s. Are E and F independent, if the bit strings of length four are equally likely?

5) Two cards are drawn form a well-shuffled ordinary deck of 52 cards. Find the probability that they are both aces if the first card is
   a) Replaced
   b) Not replaced

6)
   a) Box I contains 3 red and 2 blue marbles while Box II contains 2 red and 8 blue marbles. A fair coin is tossed. If the coin turns up heads, a marble is chosen from Box I; if it turns up tails, a marble is chosen from Box II. Find the probability that a red marble is chosen.
   b) Assuming that the one who tosses the coin does not reveal whether it has turned up heads or tails (so that the box from which a marble was chosen is not revealed) but does reveal that a red marble was chosen. What is the probability that Box I was chosen (i.e., the coin turned up heads)?

7) How many different three-letter initials are there that begin with an A?

8) How many strings of three decimal digits
   a) Do not contain the same digit three times?
   b) Begin with an odd digit?
   c) Have exactly two digits that are 4s?

9) How many license plates can be made using either two uppercase English letters followed by four digits or two digits followed by four uppercase English letters?

Note: Your answers should show your step-by-step work. Anwers which have only final results are not accepted.