Homework 6

Due Date: Wednesday February 15, 2012.

Problem 1. (5 pts.) How many $n$-character palindromes can be formed over the alphabet of $[0, 1]$

Problem 2. (5 pts) A flag is to consist of six vertical stripes in yellow, green, blue, orange, brown, and red. It is not necessary to use all the colors. The same color may be used more than once. How many possible flags are there with no two adjacent stripes the same color?

Problem 3. (5 pts.) A three out of five series is a competition between two teams consisting of at most five games and ending as soon as one of the two competing teams wins three games. How many different three out of five series are possible? Two series are “different” if the sequence of winners and losers in one series is not the same as the other series.

Problem 4. (6 pts.)

a) How many integers from 1 through 1000 are multiples of 2 or multiples of 9?

b) Suppose an integer from 1 through 1000 is chosen at random. What is the probability that the integer is a multiple of 2 or a multiple of 9?

c) How many integers from 1 through 1000 are neither multiples of 2 nor multiples of 9?

Problem 5. (10 pts.) A study was done to determine the efficacy of three different drugs– A, B, and C –in relieving headache pain. Over the period covered by the study, 50 subjects were given the chance to use all three drugs. The following results were obtained:

- 21 reported relief from drug A.
- 21 reported relief from drug B.
- 31 reported relief from drug C.
- 9 reported relief from both drugs A and B.
- 14 reported relief from both drugs A and C.
- 15 reported relief from both drugs B and C.
- 41 reported relief from at least one of the drugs.
a) How many people got relief from none of the drugs?

b) How many people got relief from all three drugs?

c) Draw the Venn diagram for this problem.

d) How many subject got relief from drug A only?

**Problem 6.** (7 pts) A gambler decides to play successive games of blackjack until she loses three times in a row. Using L and W to denote loss and win respectively, one such sequence might be WWLLL (a five game sequence). Let $g_n$ be the number of ways the gambler can play $n$ games.

a) Find $g_3$, $g_4$, $g_5$, and $g_6$

b) Find a recurrence relation for $g_n$

**Problem 7.** (4 pts. Extra Credit)

a) How many IPv4 addresses are possible? An IPv4 address is a 32-bit field.

b) How many IPv6 addresses are possible? An IPv4 address is a 128-bit field.