1 Practice Problems (Not to be handed in)

1. Problems (pages 11-14) 5, 23, 24, 29, 31, 34, 36
2. Problems (pages 24-26) 4, 8, 12, 17, 20, 22, 30

2 Homework Problems (To be handed in)

1. How many bit strings contain exactly five 0 and 14 1, if every 0 must be immediately followed by 2 successive 1.

2. Determine how many strings of n lowercase letters from the English alphabet contain
   (a) the letter a.
   (b) the letters a and b.
   (c) the letters a and b in consecutive positions with a preceding b, with all letters of the string distinct.
   (d) the letters a and b, where a is somewhere to the left of b in the string, with all letters distinct.

3. Five rooms of a house are to be painted in such a way that rooms with an interconnecting door have different colors. If there are $n$ colors available, how many different color schemes are possible when the rooms in the house are arranged in the following way?
   (a) Connected rooms form a linear order with one door interconnecting two adjacent rooms.
   (b) Connected rooms form a linear order with one door interconnecting two adjacent rooms. The first and last rooms must be colored differently.
   (c) Connected rooms form a circular order with one door interconnecting two adjacent rooms.

4. (a) How many terms are there in the expansion of $(1 + x)^{25}$?
   (b) Determine the coefficients of $x^3$ and $x^{10}$. 
(c) Determine the largest coefficient.