ICS 6D **Due: Friday, May 22, 2015, 2:00PM**

Homework 7, Part II

Instructor: Sandy Irani Covers May 18 reading

This is the second part of homework 7. Please submit your solutions to both parts I and II stapled together in one submission. It will be graded as one assignment.

Leave your answer for the questions below as an arithmetic expression, including the $P(n,k)$ or $\binom{n}{k}$ notation. You do not have to compute a final numeric value.

8. A cookie store sells 6 varieties of cookies. It has a large supply of each kind.
   (a) How many ways are there to select 15 cookies?
   (b) How many ways are there to select 15 cookies if at least three must be choclate chip?
   (c) How many ways are there to select 15 cookies if at most 2 can be sugar cookies?
9. How many ways can 13 identical balls be distributed into 3 distinct boxes?
10. A movie theater offers 6 showings of a movie each day. A total of 1000 people come to see the move on a particular day. The theater is interested in the number of people who attended each of the six showings. How many possibilities are there for the tallies for each showing for that day?
11. In the following question, we will count distinct integer solutions to the equation: $x_1+x_2+x_3+x_4 = 35$.
    (a) How many solutions are there if all the variables must be ≥ 0?
    (b) How many solutions are there if all the variables must be positive?
    (c) How many solutions are there if $x_1 \geq 2$, $x_2 \geq 4$, $x_3 \geq 0$, and $x_4 \geq 0$?
    (d) How many solutions are there to the equation $x_1+x_2+x_3+x_4 \leq 35$ in which all the x_i are non-negative? *(Hint, add an extra variable y such that y is non-negative and $x_1+x_2+x_3+x_4+y = 35$.)*
12. A man is distributing his coin collection with 35 coins to his five grandchildren. How many ways are there to distribute the coins if:
    (a) The coins are all the same.
    (b) The coins are all distinct.
    (c) The coins are the same and each grandchild gets the same number of coins.
    (d) The coins are all distinct and each grandchild gets the same number of coins.
13. An employee of a grocery store is placing an order for soda. There are 8 varieties of soda and they are sold in cases. Each case contains is all the same variety. The store will order 50 cases total.
    (a) How many ways are there to place the order?
    (b) How many ways are there to place the order if she orders at least 3 of each variety?
    (c) How many ways are there to place the order if she does not order more than 20 cases of Coke?
    (d) How many ways are there to place the order if she does not order more than 25 of any single variety?