Discrete Structures Homework 8

Include your name, the homework number, and your complete work, including any steps used to obtain the answer. Submit a hard copy - written out legibly or printed - before class.

Section 6.1

4. A particular brand of shirt comes in 12 colors, has a male version and a female version, and comes in three sizes for each sex. How many different types of this shirt are made?

8. How many different three-letter initials with none of the letters repeated can people have?

28. How many license plates can be made using either three digits followed by three uppercase English letters or three uppercase English letters followed by three digits?

Section 6.2

4. A bowl contains 10 red balls and 10 blue balls. A woman selects balls at random without looking at them.
   a) How many balls must she select to be sure of having at least three balls of the same color?
   b) How many balls must she select to be sure of having at least three blue balls?

18. Suppose that there are nine students in a discrete mathematics class at a small college.
   a) Show that the class must have at least five male students or at least five female students.
   b) Show that the class must have at least three male students or at least seven female students.

36. A computer network consists of six computers. Each computer is directly connected to at least one of the other computers. Show that there are at least two computers in the network that are directly connected to the same number of other computers.

Section 6.3

4. Let S = {1,2,3,4,5}.
   a) List all the 3-permutations of S.
   b) List all the 3-combinations of S.

10. There are six different candidates for governor of a state. In how many different orders can the names of the candidates be printed on a ballot?

18. A coin is flipped eight times where each flip comes up either heads or tails. How many possible outcomes
   a) are there in total?
   b) contain exactly three heads?
   c) contain at least three heads?
   d) contain the same number of heads and tails?

22. How many permutations of the letters ABCDEFGH contain
   a) the string ED?
   b) the string CDE?
   c) the strings BA and FGH ?
   d) the strings AB, DE, and GH?
   e) the strings CAB and BED?
   f) the strings BCA and ABF ?