

**COMP 170 Discrete Mathematical Tools for CS**  
**2005 Fall Semester – Model Written Assignment**

This handout is meant to illustrate how solutions to COMP170 assignments should be written. Note that there are many possible ways to write the solutions and these are only suggestions. The most important thing is that solutions should contain explanations as to how they were derived.

A smaller issue is that you should always use the notation taught in class. For example, you should use  $\binom{n}{2}$  and not  ${}_nC_2$ .

**Problem 1:** In how many ways can you draw a first card and then a second card from a deck of 52 cards?

*Answer: The set of possible draws is a union of 52 sets (one for each possible first card), each of size 51. So, by the product principle, there are  $52 \cdot 51$  ways to draw the two cards.*

**Problem 2:** In how many ways can you draw two cards from a deck of 52 cards?

*Answer: As in the previous solution, there are  $52 \cdot 51$  ways to draw the two cards. Since order doesn't matter here, there are two ways to draw each possible set, so the final solution is  $52 \cdot 51/2$ .*

Another equally valid solution would be to write that *This is the same problem as choosing a set of 2 items out of 52 which, as we saw in class, is  $\binom{52}{2} = 52 \cdot 51/2$ .*

**Problem 3:** In how many ways can a ten-person club select a two-person executive committee from among its members?

*Answer: This is the problem of choosing a two-item subset from ten items, so the answer is  $\binom{10}{2} = 10 \cdot 9/2$ .*

**Problem 4:** If  $M$  is an  $m$ -element set and  $N$  is an  $n$ -element set, how many ordered pairs are there with the first member in  $M$  and the second member in  $N$ ?

*Answer: The set of possible pairs  $(m, n)$  is the union of  $M$  sets (one for each possible value of  $m$ ) each of size  $N$  (for each possible value of  $n$  in the pair). So, by the product principle, the answer is  $M \cdot N$ .*