University of Toronto at Scarborough
CSC A67/MAT A67 - Discrete Mathematics, Fall 2015

Exercise #2: Counting with Repetition

Due: September 25, 2015 at 11:59 p.m.
This assignment is worth 3% of your final grade.

Warning: Your electronic submission on MarkUs affirms that this exercise is your own work and no one else's, and is in accordance with the University of Toronto Code of Behaviour on Academic Matters, the Code of Student Conduct, and the guidelines for avoiding plagiarism in CSC A67/MAT A67.

This exercise is due by 11:59 p.m. September 25. Late exercises will not be accepted.

1. Form a seven-letter word by mixing up the letters in the word COMBINE.   [6]

   (a) How many ways can you do this?

   (b) How many ways can you do this if all the vowels have to be at the beginning?

   (c) How many ways can you do this if no vowel is isolated between two consonants?
       (eg. EBMCION and MOIENCB are acceptable, but BEMCNIO is not)

2. A men's field lacrosse team consists of ten players: three attackmen, three midfielders, three defenders,   [3]
   and one goaltender. Given a set of 10 team members, how many different ways are there to assign the
   roles of attackmen, midfielders, defenders, and goaltender?
   Count in *two* different ways and verify that your answer is the same.

3. Snow White has 50 (American) one-dollar bills, which she wishes to divide up among seven different   [2]
   dwarves. Each dwarf may receive any integral (whole) number of bills, from 0 to 50. How many
   different ways can she distribute this money?

4. Suppose you have four squares of stained glass, all of different colours, and you wish to make a 2x2   [3]
   square stained glass window. How many different windows are possible?
   (Note that any pattern may be rotated 180°, flipped vertically, or flipped horizontally. You should
   count all the possible resulting patterns as the same window.)

[Total: 14 marks]