Discrete Mathematics, Fall 2015

CSCA67 - FINAL EXAM & ANSWERS

UNIVERSITY OF TORONTO SCARBOROUGH

GOOD LUCK EVERYONE!
-Richard

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1. Your local grocery store just received a large shipment of apples, oranges, pears, and bananasmore than 100 pieces each. You are shopping at the store and will purchase your fruit for the week.

   (a) How many ways can you select 10 pieces of fruit from your stores supply of apples, oranges, pears, and bananas?

   let f_i denote a kind of fruit

   $f_1 + f_2 + f_3 + f_4 = 10, f_i \geq 0, i \in [1, 4]$

   Total $= \binom{10 + (4-1)}{4-1}$

   (b) How many ways can you select 10 pieces of fruit from your stores supply of apples, oranges, pears, and bananas if you need at least one piece of each kind of fruit?

   let f_i denote a kind of fruit

   $f_1 + f_2 + f_3 + f_4 = 10, f_i \geq 1, i \in [1, 4] \equiv f_1 + f_2 + f_3 + f_4 = 6, f_i \geq 0, i \in [1, 4]$

   Therefore, Total $= \binom{6 + (4-1)}{4-1}$

2. In how many ways can six 3s and four 2s be arranged in a row so that the 2s are always apart?