

## Math 135: Discrete Mathematics, Spring 2010

### Worksheet 11

1. A bagel shop has onion bagels, poppy seed bagels, egg bagels, salty bagels, pumpernickel bagels, sesame seed bagels, raisin bagels, and plain bagels. How many different ways are there to choose:
  - (a) six bagels?
  - (b) a dozen bagels?
  - (c) a dozen bagels with at least one of each kind?
  - (d) a dozen bagels with at least 3 egg bagels and no more than 2 salty bagels?
2. How many different strings can be made from the letters in ILLINOIS, using all the letters?
3. How many ways are there to choose eight coins from a piggy bank containing 100 identical pennies and 80 identical nickels?

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4. Suppose that a large family has 14 children, including two sets of identical triplets and three sets of identical twins. How many different ways are there to seat these children in a row of chairs if the identical triplets and twins cannot be distinguished from one another?
5. A student has 3 mangoes, two papayas, and two kiwi fruits. If the student eats one piece of fruit per day, and only the type of fruit matters, in how many different ways can these fruits be consumed?
6. In how many ways can  $n$  books be placed on  $k$  different shelves if:
- (a) the books are indistinguishable copies of the same title?
  
  
  
  
  
  
  
  
  
  
  - (b) no two books are the same, and the positions of the books on each shelf matters?