MATH/CSCI 2113, DISCRETE STRUCTURES II, Winter 2010

Handout 1: Combinatorics
Wednesday, January 13, 2010

Problem 1. How many ways can 7 books be arranged on a bookshelf?

Problem 2. If you have 15 employees and you need to form a committee of 5, how many ways can you do it?

Problem 3. A group of 15 swimmers needs to be assigned to 3 trainers, so that each trainer will be assigned 5 swimmers. How many ways are there to do this?

Problem 4. 5 men and 5 women are to be seated around a round table, such that men and women alternate. How many different ways are there to do this?

Problem 5. An Ontario license plate consists of 4 letters and 3 digits. How many possible plates are there?

Problem 6. How many ways are there to arrange (permute) the letters in the word "TOMORROW"?

Problem 7. A box of crayons contains 15 different crayons. How many different ways are there of selecting 4 crayons from the box?

Problem 8. A pizza shop offers five different kinds of pizza. You need to order 10 pizzas for a party. You want to have at least one "veggie" and at least one "meat lovers". How many possibilities are there for ordering the 10 pizzas?

Problem 9. A pizza shop offers five different kinds of pizza: "veggie", "cheese", "pepperoni", "meat lovers", and "chicken bbq". You need to order 10 pizzas, and at least one of the pizzas has to be vegetarian, but this could be "veggie" *or* "cheese". How many possibilities are there for ordering the 10 pizzas?

Problem 10. Six people need to be seated on six chairs that are lined up in a row. Person "A" does not want to sit next to person "B", and neither of them wants to sit on an end seat. How many possible arrangements are there?

Problem 11. How many integers from 0 through 99,999 contain the digit "6" exactly once?

Problem 12. You want to color the sides of a 6-sided die with six different colors red, green, blue, yellow, orange, purple. How many different ways are there to do this? Two ways are considered "the same" if one can be transformed to the other by a rotation of the die.

Problem 13. A deck of 52 cards is dealt to four people, so that each person gets a set of 13 cards. How many possible arrangements of cards are there?

Problem 14. A box of chocolates contains 4 almond truffles and 4 rum caramels. You are allowed to take 6 pieces of chocolate. How many different ways do you have of choosing them (assuming that the almond truffles are all the same, and the rum caramels are all the same).