CS 171
Homework Assignment 1h

Given: January 19, 2012 **Due:** January 24, 2012

This assignment is due by the end of the class on the due date. Unless all problems carry equal weight, the point value of each problem is shown in [ ]. To receive full credit all your answers should be carefully justified. Each solution must be the student's own work. Assistance should be sought or accepted only from the course staff. Any violation of this rule will be dealt with harshly.

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1. Answer each of the following questions. You don't need to show your work.

a. How many different three-letter initials can people have?

b. How many different three-letter initials with none of the letters repeated can people have?

c. A multiple-choice test contains 10 questions. There are four possible answers to each question. How many ways can a student answer the questions on the test if the student answers every question?

d. In the scenario of (c) how many ways can a student answer the questions on the test if the student can leave answers blank?

e. How many license plates can be made using either three digits followed by three letters or three letters followed by three digits?

f. Eight athletes participate in a race. Calculate the number of possible outcomes of the race if no ties are allowed.

2. We have k distinct balls and n distinct bins. We want to distribute the balls among the bins. How many distributions are possible if there is no bound on the number of balls in each bin? Assume that all balls are distributed among the bins.

3. How many strings of eight English letters are there

a. that contain no vowels, if letters can be repeated?

b. that contain no vowels, if letters cannot be repeated?

c. that start with a vowel, if letters can be repeated?

d. that start with a vowel, if letters cannot be repeated?

4. A palindrome is a word that reads the same forward and backward. For example, *abba* and *cdededc* are palindromes. How many palindromes of length n can be formed using 26 lower-case letters of the English alphabet?

5. Suppose you have 10 different computer science books, 15 different mathematics books, and 4 different biology books. You want to arrange these books on a shelf such that the books of each subject are contiguous. How many such arrangements are possible?

6. You own three different rings. You wear all three rings, but no two of the rings are on the same finger, nor are any of them on your thumbs. In how many ways can you wear your rings? (Assume any ring will fit on any finger and you may wear these rings on the fingers of both hands).