CSCI 1900 - Homework 12 - B

**Section 6.1, 6.3: Introduction to Counting; Permutations and Combinations**  *(41)*

For each of the following problems, **beginning with problem 3**, record:

* The set appropriate to the problem,
* Whether order matters or not, and
* If duplicates are allowed or not.

Then solve the problem.

1. Compute the following by evaluating the appropriate formula. If your calculator has a n*P*r key, **do not use it for this problem.** (3 points)
   1. 5*P*5
   2. 6*P*2
   3. n*P*n-2
2. Compute the following by evaluating the appropriate formula. If your calculator has a n*C*r key, **do not use it for this problem.** (3points)
   1. 7C7
   2. 5C3
   3. n+2Cn-2
3. A website password consists of three upper case letters, followed by 4 digits. How many different passwords are there? (2 points)
4. A fair coin is flipped 5 times. How many different sequences of heads and tails are possible? (2 points)
5. How many ways can a seven card hand be dealt from an ordinary deck of 52 cards? (2 points)
6. Consider the set of all electronic circuits with two inputs (P and Q) and one Output. Each input may have 2 possible values (represented by 0 and 1). Each circuit may be represented by a table of the form

|  |  |  |
| --- | --- | --- |
| P | Q | Output |
| 1 | 1 | 1 |
| 1 | 0 | 0 |
| 0 | 1 | 0 |
| 0 | 0 | 0 |

How many distinct circuits can be constructed? (Phrased another way, how many distinct tables of this form can be constructed?) (2 points)

P

Q

Output

1. Consider the following pseudo code.

for i = 1 to 5

for j = 1 to 4

for k = 1 to 7

*{Some statement}*

next k

next j

next i

Given that *{Some statement}* is a simple executable statement and not a looping or decision structure, how many times will *{Some statement}* be executed? (2 points)

1. For your spring break trip, you want to pack some CDs. Your collection contains 12 country CDs, 15 pop CDs, 12 classical CDs and 10 acid rock CDs. If you wish to pack 11 country CDs, 12 pop CDs, 2 classical CDs and 5 acid rock CDs, how many different ways can you make your choice? (2 points)
2. How many ways can the letters in the word ACQUIRE be arranged in a row? (2 points)
3. How many ways can the letters in the word ACQUIRE be arranged in a row if Q must always be followed by U ? (2 points)
4. Suppose that an urn contains thirteen balls, seven red balls and six black balls. How many ways can five balls be chosen so that

(6 points)

* 1. All five are red? (1 points)
  2. All five are black? (1 points)
  3. Two are red and three are black? (1 points)
  4. At most three are black? (1 points)
  5. At least two are red? (1 points)

1. How many sequences of three letters can be formed from the word ACQUIRE ? (2 points)
2. Aardvark Computers is having a sale featuring a choice of four different models of laptops, two different keyboards, and three different printers. How many distinct computer setups can you purchase? (2 points)
3. You have been asked to buy the drinks for the next ACM meeting. You are to buy a total of twelve 2-liter bottles, chosen from Cola, Root Beer, Cherry, and Diet Cola. How many different ways can you make the purchase? (2 points)
4. How many distinguishable permutations of the letters in the word KNICKKNACK are there? (2 points)
5. A committee of seven is to be chosen from a list of ten faculty members and eight students. (3 points)
   1. If the committee is to contain four faculty members and three students, how many distinct committees could be formed? (1 points)
   2. If in addition, one of the faculty committee members is designated to serve as chairman, how many distinct committees could be formed? (1 points)