

## Section #1 Review

### CSE 312: Foundations of Computing II

### Quiz Section #1: Permutations and Combinations

#### Review/Mini-Lecture/Main Theorems and Concepts From Lecture

**Product Rule:** Suppose there are  $m_1$  possible outcomes for event  $A_1$ , then  $m_2$  possible outcomes for event  $A_2, \dots, m_n$  possible outcomes for event  $A_n$ . Then the total possible outcomes overall is:

**Number of ways to order  $n$  distinct objects:**

**Permutations** (number of ways to arrange  $k$  objects out of  $n$  when order matters):

**Combinations** (number of ways to choose  $k$  objects out of  $n$  when order doesn't matter):

**Multinomial Coefficients:** Suppose there are  $n$  objects, but only  $k$  are distinct, with  $k \leq n$ . (For example, "godoggy" has  $n = 7$  objects [characters] but  $k = 4$  distinct objects,  $\{g, o, d, y\}$ ). Let  $n_i$  for  $i = 1, \dots, k$  be the number of times object  $i$  appears. (For example,  $(3, 2, 1, 1)$  continuing the "godoggy" example). The number of ways to arrange the  $n$  objects is

#### Exercises

1. How many ways are there to select 5 cards from a standard deck of 52 cards, where the 5 cards contain cards from at most two suits if:

a. order does not matter

b. order matters

2. Consider a set of 25 people that form a social network. (The structure of the social network is determined by which pairs of people in the group are “friends”.) How many possibilities are there for the structure of this social network?

3. Suppose we have 3 diamonds and 3 hearts from a standard deck of cards. How many ways are there to arrange the cards if they have to alternate suit?

4. How many ways are there to have three initials that have two being the same or all three being the same?