ECS 315: In-Class Exercise # 5

Date: **30** / **08** / 2018

Name		ID (last 3 digits)		
Prapun		**5**	**5**	**5**

Instructions

1. Separate into groups of no more than three persons. **The group cannot be the same as any of your former groups**.
2. **Write down all the steps** that you have done to obtain your answers. You may not get full credit even when your answer is correct without showing how you get your answer.
3. **Do not panic.**

1. Calculate the following quantities:

   a. $3! = 3 \times 2 \times 1 = 6$

   b. $\binom{6}{3} = \frac{6!}{3! \, 3!} = \frac{6 \times 5 \times 4}{3 \times 2 \times 1} = 20$

   c. $(6)_3 = 6 \times 4 \times 5 = 120$

   d. $\binom{6}{1,2,3} = \frac{6!}{1! \, 2! \, 3!} = \frac{6 \times 5 \times 4}{2} = 60$

2. Suppose we sample 4 objects from a collection of 6 distinct objects. Calculate the number of different possibilities when

   a. the sampling is ordered and performed with replacement

   $$6 \times 6 \times 6 \times 6 = 6^4 = 1{,}296$$

   b. the sampling is ordered and performed without replacement

   $$6 \times 5 \times 4 \times 3 = 360$$

   c. the sampling is unordered and performed without replacement

   $$\binom{6}{4} = \frac{6!}{4! \, 2!} = \frac{6 \times 5}{2} = 15$$

3. Calculate the number of different results when we permute

   a. ABC

   $$3! = 3 \times 2 \times 1 = 6$$

   b. AABBCC

   $$\frac{6!}{2! \, 2! \, 2!} = \frac{6 \times 5 \times 4 \times 3}{2 \times 2} = 90$$

Don't forget to simplify your answers.