

ECS 315: In-Class Exercise # 5

Instructions

1. Separate into groups of no more than three students each. **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. Each answer should be reduced into just an integer.
Exception: When the answer is more than 10⁹, you may leave the answer in some form of simplified expression.
4. **Do not panic.**

Date: 30 / 08 / 2019			
Name			ID <small>(last 3 digits)</small>
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1. Calculate the following quantities:

a. $5! = 5 \times 4 \times 3 \times 2 \times 1 = 20 \times 6 = 120$

c. $(5)_3 = 5 \times 4 \times 3 = 60$

b. $\binom{8}{5} = \frac{8!}{5!3!} = \frac{8 \times 7 \times 6}{3 \times 2 \times 1} = 56$

d. $\binom{8}{1,2,5} = \frac{8!}{5!2!1!} = \frac{8 \times 7 \times 6}{2 \times 1} = 168$

2. Suppose we sample 5 objects from a collection of 8 distinct objects.

Calculate the number of different possibilities when

a. the sampling is ordered and performed with replacement

$$8^5 = 32,768$$

b. the sampling is ordered and performed without replacement

$$8 \times 7 \times 6 \times 5 \times 4 = 6,720$$

c. the sampling is unordered and performed without replacement

$$\binom{8}{5} = 56$$

3. Calculate the number of different results when we permute

a. ABC

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

b. AABCC

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

Don't forget to simplify your answers.