

CS 621, Assignment 1

Deadline: September 18 (5:00 pm)

Problem 0.1 *Suppose m, n are positive integers.*

1. *How many functions are there from $\{1, 2, \dots, n\}$ to $\{1, 2, \dots, m\}$?*
2. *How many of the functions f in (1) satisfy $f(i) \in \{1, 2\}$ for $i = 1, 2, 3$, ($m, n > 2$) ?*
3. *How many of the functions f in (1) are one to one functions ?*

Problem 0.2 *How many permutations of the letters $\{A, B, C, D, E, F, G\}$ are there, such that*

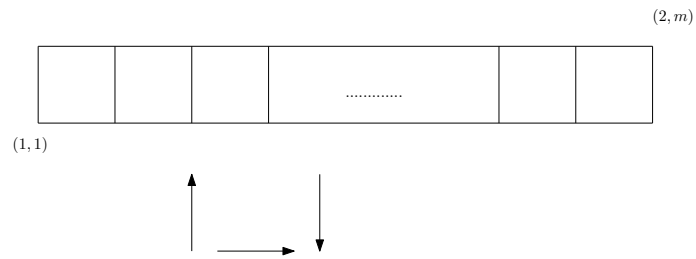
1. *A precedes B*
2. *A precedes B, and C precedes D*
3. *A precedes B, and B precedes C*
4. *C, D, E appear together in this order*
5. *A, B are appear together in this order, as do C, D*

Problem 0.3 1. *Expand $(x - z)^5$.*

2. *Expand $(2x + 3y)^6$.*
3. *What is the coefficient of x^6y^6 in the expansion of $(3x^2 - 4y^3)^5$.*

Problem 0.4 *In an $2 \times m$ grids we want to move from $(1, 1)$ to $(2, m)$ using the following rules :*

- *moving one step up or one step right or one step down.*
- *if we move down then we can not move up immediately.*



- if we move up then we can not move down immediately.

What is the number of possible ways form $(1,1)$ to $(2,m)$?

Problem 0.5 In how many ways can we select seven nonconsecutive integers from $\{1, 2, 3, \dots, 50\}$?