

# CS 1050B: Constructing Proofs

## Problem Set 4 :

Due Wednesday, Oct 18th, after the class

1. **Rosen 5.1: 22**

How many positive integers between 1000 and 9999 inclusive

- a) are divisible by 9?
- b) are even ?
- c) have distinct digits?
- d) are not divisible by 3?
- e) are divisible by either 5 or 7?
- f) are not divisible by either 5 or 7?
- g) are divisible by 5 but not by 7?
- h) are divisible by 5 and 7?

2. **Rosen 5.1: 34**

How many functions are there from the set  $\{1, 2, \dots, n\}$ , where  $n$  is a positive integer, to the set  $\{1, 0\}$ ?

3. **Rosen 5.2: 36**

Prove that at a party where there are at least two people, there are two people who know the same number of other people there.

4. **Rosen 5.3: 22**

How many permutations of the letters  $ABCDEFGH$  contain

- a) the string  $ED$ ?
- b) the string  $CDE$ ?
- c) the strings  $BA$  and  $FGH$ ?
- d) the strings  $AB$ ,  $DE$ , and  $GH$ ?
- e) the strings  $CAB$  and  $BED$ ?
- f) the strings  $BCA$  and  $ABF$ ?