# 22C: 019 Homework 2

## Total Points= 40(4% of your grade)

## Assigned 9/16/11 due 9/23/11 11:59:59 PM

## Submit your work through ICON

Solve the following problems. Please note that we will grade **only eight** of these problems. This subset will be chosen arbitrarily, and will be the same for every student.

Q1. Find the domain and the range of the following functions:

(a) The function that assigns to each 8-bit number the number of 1 bits

(b) The function that assigns to each point (x, y) on a two-dimensional plane the sum of x and y.

Q2. Determine if each of these functions is one-to-one or onto or both:

(a) The function that assigns to each student in the Discrete Structures class a cell-phone number

(b) The function f from {a, b, c, d} to {1,2,3} defined by f(a)=1, f(b)=2, f(c)=3, f(d)=1

(c) The function $f(x) = x^2 + 1$

Q3. Compute the inverse function

(a) $f(x) = x^3+9$ (b) $f(x) = \log_2 x + 1$ (c) $f(x) = 2^x + 1$

Q4. Compute $(f \circ g)(x)$ when

(a) $f(x) = x^2$ and $g(x) = 2^x$ (b) $f(x) = 2x+3$ and $g(x) = 2x+3$

Q5. Find the first five terms of the sequence $\{a_n\}$ if

(a) $a_n = -(-2)^n$ (b) $a_n = 2a_{n-1}$ and $a_0 = 3$

Q6. Find the $50^{th}$ term of the following sequences:

(a) 1, -5, 4, -3, 7, -1, 10, 1, …

(b) -3, 6, -12, 24, …

(c) 1, 1/5, 1/10, 1/15, …

Q7. Find the sum of the following sequences:

(a) -1 + 2 + 5 + 8 + … (to 70 terms)

(b) 1 + 3 + 9 + 27 + … (to 25 terms)

**Note 1.** You can type the symbols ∧ ∨ ¬ → ↔ ∃ ∀ using *Insert Symbol* in Microsoft Word.

**Note 2**. *At the end of the textbook, you can find the solutions to odd numbered exercises. These will help you in answering some of the exercises in this homework.*

**Note 3**. Homework solutions must be your own. You can discuss a problem with another student for the sake of understanding it, but do not discuss your solution. Take the help of the TAs whenever necessary.