Discrete Math Homework 4
Due Monday, February 6 at the beginning of class

There is no 2nd extra credit problem

General instructions:

- Use standard size paper (8.5 by 11).
- Answer each question in order using a single column.
- Be neat. If we cannot read your solution it is wrong.
- Show your work. If you just write an answer, you will get minimal credit even if the answer is correct.

Exam 1 is Friday, February 10 and covers all the material up to (and including) Rosen 1.5

Rosen section 1.4.

Question A) Rosen 1.4 Exercise 10 a, c, e (p. 53)

Question B) Rosen 1.4 Exercise 12 (p. 53)

Question C) Show that $\forall x.\left(P(x) \vee Q(x)\right)$ and $\forall x.P(x) \vee \forall x.Q(x)$ are not logically equivalent. (Hint: Come up with a counter example consisting of a domain and truth values for the predicates P(x) and Q(x) over that domain.)

Rosen section 1.5.

Question D) Rosen 1.5 Exercise 6 c,e (p. 64)

Question E) Rosen 1.5 Exercise 12 d, j, l, o (p. 65)

Question F) Rosen 1.5 Exercise 20 (p. 67)

Question G) Rosen 1.5 Exercise 28 b, e, i (p. 67)

Question H) Rosen 1.5 Exercise 30 (p. 67)

Question I) Rosen 1.5 Exercise 40 (p. 68) (Hint: There is a counter example for all of them. When you state the counter example in parts a, b, give a value for x and then show that the resulting predicate after substitution cannot be true. For part c, give a value for both x and y.

You may choose to solve one (and only one) of the following Extra Credit Problems. If you submit more than one, only the first will be graded.

Extra Credit 1) Rosen 1.4 Exercise 62 (p. 57)

~~**Extra Credit 2)** Rosen 1.4 Exercise 12 (p. 53)~~

Extra Credit 3) Show that $\exists x.P(x)$ and $\forall x.P(x)$ are not logically equivalent.