CPSC 229, Fall 2010 — First Test Info

The first test for this course will be given in class on Wednesday, September 22. It covers Chapter 1, Sections 1 through 7 of the textbook. (Note that this does not include Proof by Mathematical Induction.)

The test will include some "short essay" questions that ask you to define something, or discuss something, or explain something, and so on. Other than that, you can expect most of the questions to be similar to problems that have been given on the homework. You can expect to do a few simple proofs, both formal proofs and more informal mathematical proofs. This might well include a proof by contradiction.

Here are some terms and ideas that you should be familiar with for the test:

translations from logic to English, and from English to logic
ambiguities in English
propositional logic
proposition
compound proposition
the logical constants $\mathbb{T}$ and $\mathbb{F}$
the logical operators "and" ($\wedge$), "or" ($\vee$), and "not" ($\neg$)
some information is lost when translating English to logic (for example, "but" vs. "and")
truth table
logical equivalence ($\equiv$)
the conditional or "implies" operator ($\rightarrow$)
equivalence of $p \rightarrow q$ with $(\neg p) \vee q$
"the statement $p \rightarrow q$ makes no claim in the case when p is false"
the negation of $p \rightarrow q$ is equivalent to $p \wedge \neg q$
the biconditional operator ($\leftrightarrow$)
equivalence of $p \leftrightarrow q$ with $p \rightarrow q \wedge q \rightarrow p$
tautology
Boolean algebra
basic laws of Boolean algebra (double negation, De Morgan's laws, distributive laws, etc.)
showing two propostions are logically equivalent using Boolean algebra
logic circuits and logic gates
AND, OR, and NOT gates
making a circuit to compute the value of a compound proposition
finding the proposition whose value is computed by a circuit
converse of an implication
contrapositive of an implication
logical equivalence of an implication and its contrapositive

predicate logic

predicate

one-place predicate, two-place predicate, etc.

entity

domain of discourse

quantifiers, "for all" ($\forall$) and "there exists" ($\exists$)

using *variables* with predicates and quantifiers

negation of a statement that uses quantifiers

the difference between $\forall x\, \exists y$ and $\exists y\, \forall x$

arguments, valid arguments, and deduction

premises and conclusion of an argument

definition of validity of an argument

formal proof of the validity of an argument

how to show that an argument is invalid

translating arguments from English into logic

Modus Ponens

Modus Tollens

fallacies

mathematical proof

hypotheses

doing a "$\forall x\big(P(x) \rightarrow Q(x)\big)$" proof

doing an "if and only if" proof, using two cases

proving $p \vee q$ by assuming $\neg p$ and proving q based on that assumption

existence proof

counterexample

proof by contradiction

the integers, $\mathbb{Z}$

rational number (real number that can be expressed as a quotient of integers)

irrational number (real number that is not rational such as π or $\sqrt{2}$)

divisibility (for integers n and m, n is divisible by m if $n = km$ for some integer k)

prime number (only positive integer divisors are itself and 1)

even and odd numbers