

## Discrete Structures for CS Exam #1 Study Guide

Review homework 1-4. Try similar odd-numbered problems at the end of each section; their solutions are at the end of the book. When in doubt of a problem or solution, ask.

Expect questions of the following type:

- Given the domain, propositional variables/functions, compound expression, quantifiers
  - express the statement in English
  - express the negation in English
  - determine the truth value
- Given an English statement express it by specifying the domain and using propositional variables/functions, compound expressions, quantifiers
  - express the statement with a broad domain
  - express the statement with a restricted domain
  - express the negation, such that no negation precedes a quantifier
  - determine the truth value
- Given a compound expression, construct a truth table.
- Given an implication, state the converse, inverse, and contrapositive.
- Show in at least two different ways (using truth tables and using logical identities) that
  - two compound propositions are equivalent
  - a compound proposition is a tautology or a contradiction
- Given an argument
  - what rule of inference is used
  - find the error(s)
- Given premises, obtain a conclusion and state the rule of inference.
- Given a statement
  - prove it using a direct proof
  - prove it using proof by contraposition
  - prove it using proof by contradiction
  - prove it using proof by cases
  - disprove it by providing a counterexample
  - know when to use WLOG