CSCI 1323 (Discrete Structures), Spring 2013
Review for Final Exam

1 Format of the exam

The exam will be at the scheduled exam period, May 14 at noon. It will be about twice the length of the midterm (or a bit less) and so should take about two and a half hours, but you will have the whole three-hour exam period if you need it. You may use your textbook and any notes or papers you care to bring (with the exception of solutions from previous years, as described in the syllabus), but you may not use other books, a calculator or computer, or (of course!) each other's papers.

The exam will be comprehensive but will put more emphasis on material since the midterm. So, it would probably be a good idea to review

- Quizzes and minute essays (solutions online).

- Homeworks (solutions distributed, or to be distributed, in hardcopy form). If you didn't already do the "not to turn in" problems, consider doing so as a way to review.

- Midterm (solution distributed in hardcopy form).

2 Lecture topics to review

You are responsible for all material covered in class or in the assigned reading. You should review in particular the following topics. This list is *not necessarily exhaustive*, but should give you an idea of what topics I think are most significant.

- (*Review*) Propositional logic:

  - Translating English into propositional-logic wffs (emphasizing understanding of propositional logic connectives over ability to untangle complicated English).
  - Proving that a propositional-logic wff is a tautology using truth tables.
  - Proving that a propositional-logic wff is a tautology using proof rules.

- (*Review*) Predicate logic

  - Translating English into predicate-logic wffs (emphasizing understanding of quantifiers over ability to untangle complicated English).
  - Determining whether a predicate-logic wff is true in a given interpretation.
  - Proving that a predicate-logic wff is valid using proof rules.

- *(Review)* Proof techniques:

  - Direct proofs, proof by cases, proof by contraposition, proof by contradiction.
  - Proofs by induction.

- Recursion and recurrence relations:

  - *(Review)* Recursive definitions of sequences, sets, operations, and algorithms.
  - Defining and solving recurrence relations.

- Analysis of algorithms:

  - Defining and solving recurrence relations to estimate the number of basic operations performed by a recursive algorithm.

- Sets:

  - Defining sets.
  - Operations on sets.
  - Countable versus uncountable sets.

- Counting:

  - Multiplication and addition principles.
  - Pigeonhole principle.
  - Permutations and combinations.
  - Permutations and combinations with repetitions.

- Proofs of program correctness:

  - Rules for assignment, conditional statements, loops.
  - Combining these rules to verify correctness of simple programs.
  - Meaning of Hoare triples.
  - Loop invariants.

- Relations:

  - Definition and properties (reflexivity, symmetry, transitivity, antisymmetry).
  - Partial orderings and topological sorting.
  - Equivalence relations and equivalence classes.

- Functions:

  - Definitions and properties (one-to-one, onto).
  - Composition and inverse functions.
  - Order of magnitude of functions.