

## CS 81 Final exam Information, Fall 2003

The final exam is at the scheduled time, Thursday, December 18, 2-5 p.m., in the usual lecture room.

The final is **closed book**; however, you are allowed to refer to **one double-sided sheet** of paper of your own preparation. Such a sheet needs to be turned in with the exam, so you may wish to make a copy for yourself. In particular, you should include all natural deduction rules on your sheet.

The exam is comprehensive, but will be more heavily weighted toward topics following the mid-term. However, you should definitely review topics before the mid-term as well.

The topics are:

- Languages
- Finite-state automata
- Abstract states of a language and the  $I_L$  relation (Myhill-Nerode theorem)
- State minimization
- Regular expressions and languages
- Kleene's Theorem (equivalence of deterministic and non-deterministic FSA)
- Grammars
- Distinctions between types of grammars (type 0, 1, 2)
- Normal forms for grammars
- CYK algorithm
- Distinctions between types of automata, {deterministic, non-deterministic}, {fsa, pda, Turing machines}
- The pumping lemmas
- The halting problem
- Unsolvable problems
- Problem reductions
- Rice's theorem
- Countability
- Post's Correspondence Problem
- Natural deduction for proposition logic
- Derivability vs. validity
- Soundness vs. completeness
- Natural deduction for predicate logic
- Semantics of predicate logic
- Hoare logic for verifying programs
- Anything else I may have forgotten to list (ask if in doubt)