CS 229, Fall 2003 **Homework #10**

This final homework for the course **will not be collected or graded**. A solution sheet for this homework will be handed out on the last day of class.

The homework consists of the following problems from the textbook:

Section 4.5, page 185: Problems 4b, 4d, 4e
Section 5.1, page 192: 1, 2, 4
Section 5.2, page 199: 2, 4

Final Exam Info

The final exam for this course will be given on Wednesday, December 17, at 7:00 PM, in our regular classroom. It is a cumulative exam which will cover material from all parts of the course. It will not, however, include material from any section of the book marked as an "Application."

Some of the most important ideas that were covered on previous tests include: Propositional logic ($\vee$, $\wedge$, $\neg$); Quantifiers and predicate logic; Rules of logic including DeMorgan's laws; Relating logical expressions to English; Logical deduction and formal proof; The idea of mathematical proof; Mathematical induction; Proof by contradiction; Sets; Set operations ($\cup$, $\cap$, set difference, complement); Empty set; Universal set; Relationship between sets and logic; Functions; One-to-one and onto functions; Bijective functions; Infinite sets; Countable and uncountable sets; Diagonal arguments; Languages; Regular expressions; Regular languages; Finite automata; DFAs and NFAs; Grammars; Production rules; Context-free grammars and context-free languages; Parse trees; Examples of languages in various categories.

You should be familiar with the following new terms and ideas, which have not yet been covered on any test:

General grammars
The language generated by a general grammar
Turing machines (tape, cells on a tape, blank symbol, halt state...)
How a Turing machine computes
Turing-acceptable language
Turing-decidable language
Computability
Equivalence of various types of computation; the Church-Turing Thesis
Recursively enumerable language
Recursive language
"Standard" Turing machines T_0, T_1, T_2, ...
The language $K = \{a^n \mid T_n \text{ halts when run with input } n\}$
K is a recursively enumerable language that is not recursive
$\overline{K}$ is a language that is not recursively enumerable