CS46 review for midterm exam 1

Midterm exam 1 covers all material through chapter 1 of the textbook. You should be able to define and explain the following terms. For automata, you should be able to work with both the formal definitions and the drawings of finite state machines.

- proof techniques
  - direct proof
  - induction
  - proof by contradiction
- basic math & set theory terminology
  - countable, finite, countably infinite, uncountably infinite
  - reflexive, symmetric, transitive
  - closure
  - complement
  - intersection
  - concatenation
  - Kleene star
- regular language
- deterministic finite automaton
- nondeterministic finite automaton
- regular expression
- Pumping Lemma for regular languages
- the Myhill-Nerode Theorem

Make sure you understand how your knowledge in this course fits together. For the regular languages, you should know:

- the definition
- techniques to prove a language IS in this class
- techniques to prove a language IS NOT in this class
- example language(s) in this class
- example language(s) not in this class
- operations this class is closed under

(You might consider revisiting the homeworks and practice problems to find example languages we have already discussed. In general it is a good idea to have an example you can remember and revisit for any of the terminology we’ve seen — e.g., can you give an example uncountable set? how about an example set and an operation that set is closed under?)