

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
 - union
 - 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?)