

## Homework 4, CS301, McConnell, Spring '09

Due Tuesday 3/3 at the beginning of class.

Modified 2/25 11:50 to add Exercise 2.26

- Exercise 2.25. Note that the pumping lemma is always used in a *proof by contradiction*. To prove something by contradiction, assume the opposite of what you are trying to prove, and then show that this assumption leads to a contradiction.

To use the pumping lemma to show that a language is non-regular, assume that the language is regular. If it's regular, the pumping lemma applies. Then show that the pumping lemma forces strings into the language that don't belong.

Some people find this counterintuitive, because the pumping lemma only applies to regular languages, but when you use it, you assume that it applies to a language that you suspect is not regular.

Before you start the exercise, study the examples of the pumping lemma's use in the book, and notice how they follow this strategy.

- Exercise 2.35. Show your work by giving the equivalence classes under  $\equiv_0$ ,  $\equiv_1$ ,  $\equiv_2$ , etc. The algorithm will be discussed in class on 2/26.
- Exercise 2.26.