

**University of Central Florida
School of Computer Science
COT 4210 Spring 2004**

**Prof. Rene Peralta
Homework 4**

Due date: March 3

1. Construct a PDA that accepts the set of palindromes over $\Sigma = \{a, b\}$.
Use the notation of section 8.1 of the text.
2. The Pumping Lemma for Regular Languages, as stated in Theorem 7.6.3 of the text (Theorem 9 in Prof. Workman's notes), says that a long-enough word z in a regular language can be “pumped” somewhere inside a prefix of z . I have argued in class that restricting the lemma to a prefix is unnecessary. State the more general pumping lemma. (You do not need to prove it, but you must state it precisely).
3. For each language in exercise 12, section E, of Prof. Workman's notes answer the following.
 - Can the language be proven non-regular by a direct application of the “pump at prefix-only” version of the Pumping Lemma?
 - Can the language be proven non-regular by a direct application of the more general version of the Pumping Lemma?
4. Consider the languages e through k of the previous question. For each, either construct a PDA or prove that the language is not a CFL. Use the notation of section 8.1 of the text.
5. Consider the language L over $\Sigma = \{a, b, c\}$ consisting of words with more a 's than b 's and more b 's than c 's. Prove or disprove L is a CFL.