

Homework 1
CS560 Winter 2005

DUE: January 27th in class.

Objective: 1) To better understand context-free grammars.
2) To gain experience using a functional language.

Part 1) Consider the context free grammar below in which non-terminals are written in upper case and terminals are written in lower case:

```
SENTENCE ::= PERSON APPRECIATES MUSIC | MUSIC APPRECIATES PERSON  
  
MUSIC ::= rocknroll | rap | jazz  
APPRECIATES ::= likes | loves | adores  
PERSON ::= george | martha
```

1) Give a derivation and parse tree for the sentence:

george loves rocknroll

2) Is

rocknroll loves rocknroll

a legal sentence? Why or why not?

3) Show 5 legal sentences in this language.

4) Show 5 illegal sentences in this language using the same set of terminals.

5) A palindrome is a sequence of terminal symbols that reads the same as its reverse. For example, "mom" and "madam i'm adam" are both palindromes (up to the punctuation in the latter case). Write a context free grammar for palindromes over the alphabet {a, b, c}.

Part 2) LISP

Go through the LISP tutorial found at: <http://mypage.iu.edu/~colallen/lp/>

You can go through the entire tutorial if you would like, however, only exercises from [Defining LISP functions](#) and [Recursion and Iteration](#) will be graded.

Turn in exercises 3, 4, 5 from [Defining LISP functions](#) and 2, 4, 5 from [Recursion and Iteration](#).