

Exercise 2

Due at 3:30 PM (on paper), February 10, 2009.

1. (25 pts) Consider the following grammar:

$$\begin{aligned} S &\rightarrow aScB \mid A \mid b \\ A &\rightarrow cA \mid c \\ B &\rightarrow d \mid A \end{aligned}$$

Which of the following sentences are in the language generated by this grammar? For those that are, use a parse tree to show a derivation.

- abcd
 - acccbd
 - accbcc
 - acd
 - accc
2. (20 pts) Show that the following grammar is ambiguous by drawing two different parse trees for the same string of your choosing.

$$\begin{aligned} foo &\rightarrow AAA \ bar \ qux \mid DDD \\ qux &\rightarrow CCC \ foo \mid \epsilon \\ bar &\rightarrow BBB \ foo \end{aligned}$$

3. (30 pts) For each of the following grammars, why is the grammar not LL(1)? Modify each one to fix the problem.

a.

$$\begin{aligned} foo &\rightarrow AAA \ bar; &<- \text{start symbol} \\ bar &\rightarrow bar \ BBB \\ bar &\rightarrow BBB \end{aligned}$$

b.

$$\begin{aligned} foo &\rightarrow AAA \ bar &<- \text{start symbol} \\ bar &\rightarrow BBB \ foo \\ bar &\rightarrow BBB \ qux \\ qux &\rightarrow CCC \end{aligned}$$

4. (25 pts) Write a paragraph summarizing significant characteristics of the following scripting languages. Use Perl as a point of comparison. If you use other sources besides the book, cite them.

- bash
- awk
- tcl
- Python
- Ruby