

Written Assignment 4

Due February 21, 2006

This assignment asks you to prepare written answers to questions on LR parsers. Each of the questions has a short answer. You may discuss this assignment with other students and work on the problems together. However, your write-up should be your own individual work. Remember that written assignments are to be turned in either at the start of lecture or in the CS164 homework box in 283 Soda by 12:30 PM on the due date.

Please write your name, your account name, your TA's name, and your section time on your homework! We need this information so that we can give you credit for the assignment and so that we can return it to you.

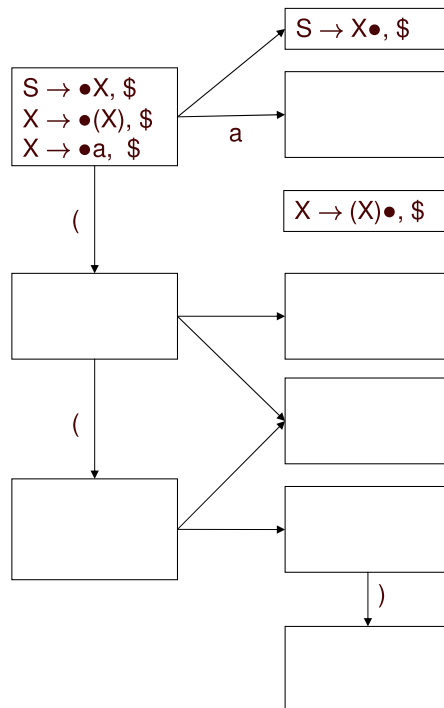
1. In each of the following cases, give as simple a grammar as you can.
 - (a) Give an LR(1) grammar that is not LL(1). Explain why your grammar is LR(1) and not LL(1).
 - (b) Give an unambiguous grammar that is not LR(1). Explain why your grammar is unambiguous and not LR(1).

Hint: In each of the above cases, there exists a grammar that generates a language with only two strings.

2. Consider the following grammar with start symbol S :

$$\begin{aligned}
 S &\rightarrow X \\
 X &\rightarrow (X) \mid a
 \end{aligned}$$

The following figure shows a skeleton of the LR(1) parsing DFA for this grammar.



- (a) Complete the DFA skeleton. You need to fill in the LR(1) items for each state of the DFA, add new transitions, and label each transition. (You should not add any new states though.)
Hint: One of the states has a self-loop.
- (b) Is the grammar LR(1)? Is the grammar LR(2)? Is the grammar LL(1)? Why or why not?
- (c) Use your DFA to parse $((((a))))$. Show the sequence of shift/reduce steps.