

Homework 2: CFG and Parsing

Due before class Sep 21, 2011

- (15pts) Construct a BNF for each of the following languages. Is your grammar ambiguous? If yes, rewrite it to be non-ambiguous. Give an input string of the language and draw the parse tree and AST for your input.
 - The language described by regular expression $(0011|1100)^*(11|00)$
 - The set of all expressions over $\{ \text{id}, \text{num}, +, *, \wedge, (,) \}$ where $+$, $*$, and \wedge are binary operators, and $()$ are used for grouping purposes. Both $+$ and $*$ are left-associative, but \wedge is right associative. Further, $+$ has lower precedence than $*$, and $*$ has lower precedence than \wedge .
 - Strings of balanced parentheses over $(,), [,]$. For example, $()$, $()()$, $((()))$ and $([]())$ are in the language, but $)()$, $((()$, and $([$ are not in the language.
- (10pts) The following grammar is not suitable for a top-down predictive parser. Identify the problems and correct them by rewriting the grammar. Show that your grammar satisfies LL(1) condition by building a LL(1) parse table for it.

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A ::= A a B | B
B ::= B C | b B | b
C ::= C c | c
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