
HW 6 – BNF Grammars

CS 421 – Summer 2013

Revision 1.0

Assigned July 5, 2013

Due July 12, 2013, 11:59 PM

Extension 48 hours (20% penalty)

1 Change Log

1.0 Initial Release.

2 Turn-In Procedure

Your answers to the following questions are to be submitted electronically via the `handin` script.

3 Objectives and Background

The purpose of this HW is to test your understanding of

- BNF grammars
- grammar disambiguation
- parse trees

Another purpose of HWs is to provide you with experience answering non-programming written questions of the kind you may experience on the midterms and final.

4 Problem

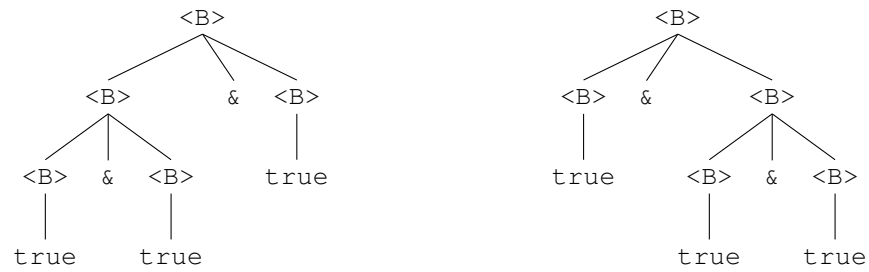
(23 pts) Consider the following grammar:

$$\langle B \rangle ::= \langle B \rangle \ \& \ \langle B \rangle \mid \neg \langle B \rangle \mid (\langle B \rangle) \mid \text{true} \mid \text{false}$$

1. (4pts) Demonstrate that the grammar is ambiguous by showing two different parse trees for a single string in the grammar.
2. (10pts) Disambiguate the above grammar. $\neg$ should have higher precedence than $\&$, and $\&$ should be right associative.
3. (9pts) Using your disambiguated grammar, give a parse tree for $\neg(\neg\text{true} \ \& \ \neg\text{false})$.

Answer:

1. The string `true & true & true` has the following two parse trees and is thus ambiguous.



2. $\langle B \rangle ::= \langle N \rangle \ \& \ \langle B \rangle \mid \langle N \rangle$
 $\langle N \rangle ::= \neg \langle N \rangle \mid (\langle B \rangle) \mid \text{true} \mid \text{false}$
- 3.

