Solutions for Assignment #11

Assignment Information

Maximum grade 20

Due date December 8, 2004

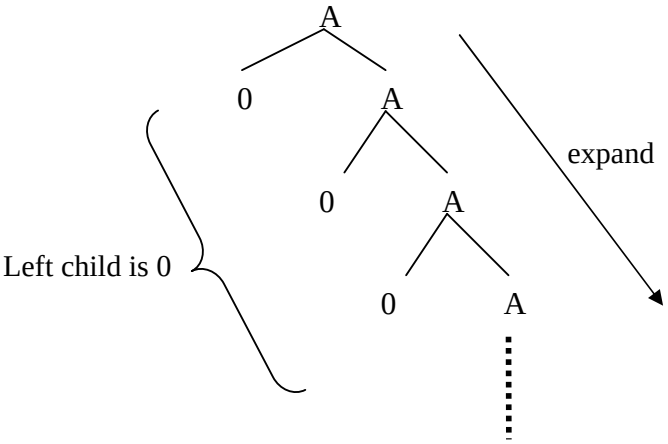
Instructions Textbook:
Page: 214
Problems: 5.4.3, 5.4.5

5.4.3

S → aS | aTbS | ε
T → aTbT | ε

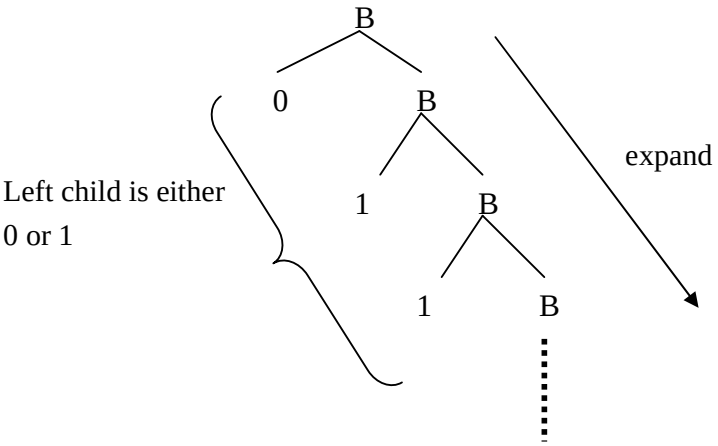
5.4.5 a) Show that this grammar is unambiguous.

This grammar is unambiguous because of following reasons.
S → A1B
S is replaced by A1B. "1" is between A and B, so "1" divides S into A and B. S has only one production.
A→0A | ε
A is replaced by 0A or ε . "**A→0A" | ε** "does not make this grammar ambiguous. (= unambiguous) As shown following tree, this A→0A replaces A to 0A. The structure of this tree is unique and expands to the right side. Left child must have 0 and right child must have A or ε



B→0B | 1B | ε

B is replaced by 0B, 1B or ε." **B→0B | 1B | ε** " does not make this grammar ambiguous. (= unambiguous) The structure of this tree is unique and expands to the right side. Left child must have 0 or 1 and right child must have B or ε .



Therefore, this grammar is unambiguous. (= produce a unique tree structure)

5.4.5 b) Find a grammar for the same language that is ambiguous, and demonstrate its ambiguity.

S → A1B
A → 0A | A0 | ε
B → 0B | 1B | ε

For a string w=0011, two parse trees are produced. Therefore, this grammar is ambiguous.