CSCI320 Programming Language Concepts
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Syntax and Grammar exercises

1. Textbook, page 247, Problem 6.14 (a), (c), and (d). Give a leftmost derivation for each and draw a parse tree.

2. Textbook, page 246, Problem 6.5 (a)

3. Consider the following BNF grammar rules:

   ```
   <pop> → [<bop>,<pop>] | <bop>
   <bop> → <boop> | (<bop>)
   <boop>  → x | y | z
   ```

   for each of the following strings give a leftmost derivation and draw a parse tree. If no such derivation is possible, indicate this

   ```
   a. (y)
   b. [y]
   c. [(x),y]
   d. [(x),[z,x],([z])]
   ```

4. Consider the following grammar

   ```
   <assign> → <var> = <expr>
   <expr> → <term> | <expr> + <term> | <expr> - <term>
   <term>  → <primary> | <term> * <primary> | <term> / <primary>
   <primary>  → <var> | const | <expr>
   <var> → <identifier> | <identifier>[<sublist>]
   <sub_list>  → <expr> | <sub_list>,<expr>
   <identifier>  → id
   ```

   assume here that **id** is a lexical analyzer's classification of a non-reserved name (such as might be used for a variable or function), and that **const** represents a lexical analyzer's classification of a number.

   Construct parse trees for the following expressions:

   ```
   a. B = A[X]+1

   b. B = A[X+1]

   c. X = U - V * W + X / Y
   ```