# Assignment 4

## Context-Free Grammars

## Due Monday, April 17, 2017

1. Consider the grammar

   *bexpr* → *bexpr* **or** *bterm* | *bterm*
   *bterm* → *bterm* **and** *bfactor* | *bfactor*
   *bfactor* → **not** *bfactor* | **(** *bexpr* **)** | **true** | **false**

   a) What are the terminals, nonterminals, and start symbol?
   b) Construct a leftmost derivation for the sentence **not (true or false and true)**.
   c) Construct a rightmost derivation for the sentence **not (true or false and true)**.
   d) Construct the parse tree for the sentence **not (true or false and true)**.

2. Consider the grammar

   *bexpr* → *bexpr* **or** *bexpr* | *bexpr* **and** *bexpr* | **not** *bexpr*
   | **(** *bexpr* **)** | **true** | **false**

   Show that this grammar is *ambiguous*.

3. Design a context-free grammar for each of the following languages.
   a) The set of all strings of 0's and 1's such that every 0 is immediately followed by at least one 1.
   b) The set of all strings of 0's and 1's with an equal number of 0's and 1's.

To turn in this assignment, upload a pdf file hw4.pdf that contains the solutions for this assignment to the eCourse site.