CS 314 Fall 2018
Homework Assignment 1

David Menendez

Due Tuesday, September 25, 3 AM

This assignment must be handed in through Sakai as a PDF file. Note that the due date is effectively late Monday night. There is no grace period, and no homework submitted after the deadline will be accepted.

1. Consider the grammar G below. For each string, determine whether the string is part of $L(G)$. If it is in $L(G)$, prove it by giving a parse tree. If the parse is ambiguous, prove that by giving two parse trees. If the string is not in $L(G)$, explain why not (one sentence should be sufficient).

   ```
   Start symbol S
   S ::= ‘<’ S ‘>’| S ‘&’ S | N
   N ::= C | C N
   C ::= ‘x’ | ‘y’ | ‘z’
   ```

   (a) `<xxy&z>`

   (b) `<<xx>&z&y&x>`

   (c) `<x<y>>`

   (d) `y&yy&yyy`

   (e) `<<z&xyz>`

2. Rewrite G so that it is not ambiguous.

3. Write a regular expression for the language over alphabet $\{a, b, c\}$ containing all strings with no more than two as.

4. Write a grammar for the same language. Indicate whether your grammar is ambiguous and briefly give your reasoning.