CS2203 / CSX3004 Programming Languages

Assignment 2

Due Date: Monday, June 27, 2022 by midnight

1. Start with the grammar G6, as repeated here:

   <*exp*> ::= <*exp*> + <*mulexp*> | <*mulexp*>
   <*mulexp*> ::= <*mulexp*> * <*rootexp*> | <*rootexp*>
   <*rootexp*> ::= (<*exp*>) | a | b | c

   Modify it in the following ways:

   a. Add subtraction and division operators (- and /) with the customary precedence and associativity *i.e.*, operator - is left associative with the same precedence as + and operator / is left-associative with the same precedence as *.
   b. Then add a left-associative operator % whose precedence is between + and *.
   c. Then add a right-associative operator = at lower precedence than any of the other operators.
   d. Give a syntax diagram for each of the languages of Exercise 1. Use branching and loops in your syntax diagrams to make them as nice as possible.

2. Show that the following grammar is ambiguous.

   <*person*> ::= <*woman*> | <*man*>
   <*woman*> ::= wilma | betty | <*empty*>
   <*man*> ::= fred | barney | <*empty*>

3. Give an unambiguous grammar for Exercise 2.