CSC301 Assignment #2
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Note: Please submit your work either as a PDF file. No other formats will be accepted.

Problem 3.1 a
Given the grammar G6:

G6:
<exp>* ::= <exp + <mulexp> | <mulexp> <mulexp> ::= <mulexp> * <rootexp> | <rootexp> <rootexp> ::= (<exp>) | a | b | c

Add subtraction and division operators (- and /) with the customary precedence and associativity to the grammar.

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

both the addition and subtraction have same precedence and left to right associativity. both multiplication and division have same precedence and left to right associativity.
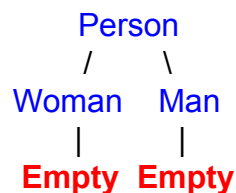
Problem 3.3 b
Show that the following grammar is ambiguous:

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

Problem 3.3b can be answered with parse trees, so same process as for assignment #1. If you draw the trees by hand, take a clear picture or visit http://ironcreek.net/syntaxtree/ to generate the parse tree and attach that, too.

The string leading to ambiguity is <empty>, this can be derived in two ways as

```
                  Person
                 /      \
             Woman     Man
               |        |
             Empty    Empty
```

So this makes the given grammar ambiguous

Problem 3.4b
Give an unambiguous grammar for the same language generated by the grammar in problem 3.3 b.

The unambiguos grammar for 3.3 b is as follows
<person> ::= wilma | betty | fred | barney | <empty>