Homework II

1. [25 points]
Find an unambiguous grammar that is equivalent to the BNF
A ::= □ | A(A)A
(terminals = {(,)}) and justify your answer (i.e., show that it's equivalent *and* unambiguous).

2. [15 points]
For each of the strings below, determine whether or not it can be derived from <expr> using the Wren grammar (Figure 1.8), and either provide a derivation tree or argue why none exists.
(a) a+5-x/2
(b) a+(5-x)/2
(c) x<0 **or** x

3. [10 points]
The usual syntax for identifiers can be given by the following non-left-recursive BNF (assuming suitable productions for <letter> and <digit>):
<ident> ::= <letter> <rest>
<rest> ::= □ | <letter> <rest> | <digit> <rest>
Show how to revise this BNF so that it does not require the use of an erasing rule (i.e., provide an equivalent BNF that eliminates <rest> □ □), and justify your answer.

4. [25 points]
Modify the Wren scanner (file scanWr in our class directory) so that it ignores comments that are written to begin with a '#' character and extend to the end of the line. Your submission for this problem should consist of a printout that contains a listing of your code, plus thorough testing of all parts of the code that you have changed or added. In addition, you should submit your code file (only) electronically to the directory Hwk2 for class c185 (follow the link on the class web page for the description of the submit command if you have not used this previously).