CSCI 325
Spring 2013
Bowring

HW6 – DUE 10 AM 15.Feb.2013

Instructions:
Submit **HW6_[lastname].pdf** by dropping it into your Assignments folder on Google Drive. Please document your work.

1. Given the following BNF:

```
<exp>  ::= (<list>) | a
<list> ::= <list>, <exp> | <exp>
```

   a. Give a leftmost derivation for the string `(a,(a,a))`.
   b. Draw a parse tree for the above derivation.
   c. Repeat a. but give a rightmost derivation.
   d. Draw a parse tree for the derivation of c.

2. Each of the grammars G1 and G2 given below defines the syntax for expressions involving identifier operands and the operations: + (binary plus), - (unary and binary minus), * (multiplication), / (division), and ^ (exponentiation). These two grammars differ slightly in how they specify the order in which their operations are evaluated.

   Grammar G1

```
<exp>  ::= <exp1> | <exp> + <exp1> | <exp> - <exp1>
<exp1> ::= <exp2> | <exp1> * <exp2> | <exp1> / <exp2>
<exp2> ::= <id> ^ <exp2> | <id>
<id>   ::= A | B | C
```

   Grammar G2

```
<exp>  ::= <exp1> | <exp1> + <exp> | <exp1> - <exp>
<exp1> ::= <exp2> | <exp2> * <exp1> | <exp2> / <exp1>
<exp2> ::= <exp2> ^ <exp3> | <exp3>
<exp3> ::= <id> | - <id>
<id>   ::= A | B | C
```

   a. Construct a parse tree in each grammar for the following sentences:

```
A + B * C
A * B ^ C
A ^ B
```

   b. Construct a parse tree in each grammar for the following sentences:

```
A + B - C
A * B / C
A ^ B ^ C
```