CS4121 Homework Assignment #2

Due Date: Friday, March 1st, 2013 at *9:05am*

1. (10 points) Show the sequence of stack changes when parsing the input id * id + id * id using the LR parsing algorithm (slide 8) and the parse table (slide 10) from the notes in class (My example, "LR parsing example", is on Canvas).

2. (18 points) For each of the following grammars, construct the set of LR(0) items, the SLR parse table and state whether the grammar is SLR or not.

   (a)

   $S \rightarrow abS \mid ab$

   (b)

   $$\begin{array}{lcl} S & \rightarrow & AaAb \mid BbBa \\ A & \rightarrow & c \\ B & \rightarrow & c \end{array}$$

   (c)

   $$\begin{array}{lcl} S & \rightarrow & ASB \mid ab \\ A & \rightarrow & a \\ B & \rightarrow & b \end{array}$$

3. (6 points) Problem 2.18(a) at page 106.

4. (10 points) Convert the following grammar to LL(1) form. Show that the converted grammar is LL(1) by calculating the predict sets.

   $$\begin{array}{lcl} B & \rightarrow & B \textbf{ or } T \\ & \mid & T \\ T & \rightarrow & T \textbf{ and } C \\ & \mid & C \\ C & \rightarrow & \textbf{not } C \\ & \mid & (\ B\ ) \\ & \mid & \textbf{true} \\ & \mid & \textbf{false} \end{array}$$

5. (8 points) Construct pseudo-code for a top-down recursive descent parser for the follow grammar. You may assume the existence of a routine called `match` that takes a character parameter and if that parameter matches the next input symbol, it advances the input pointer and returns true; otherwise it just returns false.

   $$\begin{array}{lcl} S & \rightarrow & +\ S\ T \\ & \mid & -\ S\ T \\ & \mid & \textbf{a} \\ T & \rightarrow & /\ S \\ & \mid & *\ S \\ & \mid & \textbf{b} \end{array}$$