Homework 2
Given: 2/10/09
Due Date: 2/17/09

1. For the following grammar $G_1$,

(a) Construct LR(0) sets of items for $G_1$.

(b) Fill in the SLR parsing table for $G_1$. If there are conflicts, just write both entries in the table.

$cS' \to S$
$cS \to aS \mid Ab$
$cA \to XYZ \mid \epsilon$
$cX \to cS \mid \epsilon \mid bS$
$cY \to dS \mid \epsilon$
$cZ \to eS$

**NOTE:** "$X \to \cdot \epsilon$" is equivalent to "$X \to \cdot$". If "$X \to \cdot$" is present in state $I_i$, then the parsing action should be "reduce by "$X \to \epsilon$" for each terminal in Follow ($X$).

2. For the grammar $G_1$ in Problem #1,

(a) Construct canonical-LR(1) sets of items for $G_1$.

(b) Fill in the canonical-LR(1) parsing table for $G_1$. If there are conflicts, just write both entries in the table.

3. Consider the following grammar $G_2$. (Note that terminal symbols are bold-faced.)

(0) $\text{start} \to \text{compound_stmt}$
(1) $\text{compound_stmt} \to \text{begin stmt_list end}$
(2) $\text{stmt_list} \to \text{stmt}$
(3) $\text{stmt_list} \to \text{stmt_list} ; \text{stmt}$
(4) $\text{stmt} \to \text{id assignop exp}$
(5) $\text{stmt} \to \text{id addop exp}$
(6) $\text{exp} \to \text{id}$

(a) Construct canonical-LR(1) items.

(b) Construct a canonical LR(1) parsing table.
(c) Show stack operations for an input:

\begin{align*}
\text{begin id } & \text{assignop id } ; \text{id addop id end}
\end{align*}

(d) Argue convincingly by examining the canonical-LR(1) items constructed in (a) whether $G_2$ is in SLR(0), i.e., a conflict-free SLR(0) parsing table for $G$ can be constructed. Note that you are not supposed to construct LR(0) items or SLR(0) parsing table.