(1) Show that the following grammar is LL(1) but not SLR(1)

\[ S \rightarrow AaAb \mid BbBa \]
\[ A \rightarrow \varepsilon \]
\[ B \rightarrow \varepsilon \]

(2) Show that the following grammar is SLR(1) but not LL(1).

\[ S \rightarrow SA \mid A \]
\[ A \rightarrow a \]

(3) The following is an ambiguous grammar:

\[ S \rightarrow AS \mid b \]
\[ A \rightarrow SA \mid a \]

Build a SLR(1) parsing table for this grammar. There will be conflicting actions in the table. Suppose we tried to use the parsing table in a non-deterministic manner (i.e. a conflicting action is resolved non-deterministically). Show all possible sequences of actions on input abab.

(4) Construct a LR(1) parsing table for the following grammar:

\[ S \rightarrow SS+ \mid SS* \mid a \]

(5) Construct a LR(1) parsing table for the following grammar:

\[ S \rightarrow aSa \mid bSb \mid \varepsilon \]

(6) Construct a LALR(1) parsing table for the following grammar:

\[ S \rightarrow SS+ \mid SS* \mid a \]

by simply merging states from LR(1) automaton with common core.

Also apply the efficient construction of LALR parsing table; show (1) the spontaneous lookaheads, (2) propagation of lookaheads table, and (3) the computation of lookaheads for all items.