1. Exercise 2.1 from the text on regular expression construction.

2. Construct a deterministic finite state machine that can detect strings generated by the following regular expression:

   (a) \((a \mid (b \cdot c)^* \cdot d)^+\)
   (b) \((a \cdot a \mid b)^* \cdot (a \mid b \cdot b)^*\)
   (c) \(((011)^* \cdot (2 \mid 3)^+) \cdot 0011\)
   (d) \(((c \mid a)^* b)^*\)
   (e) Construct DFAs for regular expressions given in Exercise 2.2 of the text.

3. Construct a regular expression that generates the strings accepted by the following deterministic finite state machine.
4. Exercises 3.1, 3.2, 3.3 and 3.5 from the text on CFGs, derivations and parse trees.

5. Compute First and Follow sets for all the non-terminals in the following grammars.

(a) \[\text{Expr} \rightarrow - \text{Expr} \]
\[\text{Expr} \rightarrow ( \text{Expr} ) \]
\[\text{Expr} \rightarrow \text{Var} \text{ExprTail} \]
\[\text{ExprTail} \rightarrow - \text{Expr} \]
\[\text{ExprTail} \rightarrow \epsilon \]
\[\text{Var} \rightarrow \text{id} \text{VarTail} \]
\[\text{VarTail} \rightarrow ( \text{Expr} ) \]
\[\text{VarTail} \rightarrow \epsilon \]

(b) \[S \rightarrow Ab\]
\[A \rightarrow a \mid B \mid \epsilon\]
\[B \rightarrow b \mid \epsilon\]

(c) \[S \rightarrow A B B A\]
\[A \rightarrow a \mid \epsilon\]
\[B \rightarrow b \mid \epsilon\]

6. For the following grammar show the state diagram built in constructing the SLR(1) parser. Does the state diagram contain any conflicts?

(a) \[S \rightarrow \text{id} := \text{E};\]
\[\text{E} \rightarrow \text{E} + \text{P}\]
\[\text{E} \rightarrow \text{P}\]
\[\text{P} \rightarrow \text{id}\]
\[\text{P} \rightarrow (\text{E})\]
\[\text{P} \rightarrow \text{id} := \text{E}\]

(b) \[S \rightarrow \text{id} := A;\]
\[A \rightarrow \text{id} := A\]
\[A \rightarrow \text{E}\]
\[\text{E} \rightarrow \text{E} + \text{P}\]
\[\text{E} \rightarrow \text{P}\]
\[\text{P} \rightarrow \text{id}\]
\[\text{P} \rightarrow (\text{id}; \text{id})\]
\[\text{P} \rightarrow (A)\]

7. Exercises 5.1 and 5.3 from the text on SLR(1) parsing. Also 5.7, 5.11 and 5.12.

8. Exercises 4.1 through 4.10 on Top-down parsing.