Exercise 4.1 (2.98):
Check satisfiability of the below propositional clauses using \( \Rightarrow_{CDCL} \).

\[
\begin{align*}
(1) & \quad \neg P_4 \lor P_3 & (2) & \quad \neg P_3 \lor P_4 & (3) & \quad P_1 \lor P_2 \lor P_4 \\
(4) & \quad \neg P_3 \lor \neg P_4 & (5) & \quad \neg P_1 \lor \neg P_4 \lor P_2 & (6) & \quad \neg P_2 \lor \neg P_4 \lor P_1 \\
(7) & \quad \neg P_1 \lor \neg P_2 \lor P_4
\end{align*}
\]

Exercise 4.2 (2.55):
Demonstrate the Superposition partial model construction on the following set of clauses

\[ N = \{ \neg Q_0 \lor \neg P_2 \lor Q_1, \neg Q_1 \lor Q_2, P_0 \lor Q_0, \neg Q_0 \lor P_1, Q_0 \lor P_1 \} \]

Use the atom ordering \( Q_2 \succ P_2 \succ Q_1 \succ P_1 \succ Q_0 \succ P_0 \).

Exercise* 4.3 (2.54):
Which of the following statements are true or false? Provide a proof or a counter example.

1. If \( N_T \models N \) then \( N \) is saturated.

2. If \( \delta_C = \{ P \} \) while constructing \( N_T \) then for all clauses \( D = P \lor D' \) with \( C \neq D \) we have \( \delta_D = \emptyset, D \in N \).

3. If all clauses in \( N \) have at most one positive literal and there is no clause in \( N \) having only negative literals then \( N_T \models N \).

It is not encouraged to prepare joint solutions, because we do not support joint exams.