Exercise 5.1:
Consider the following CSP $P$:
\[
(x < y; x \in [7..15], y \in [9..12])
\]
Show in detail how to apply Corollary 1 (slides IV/33) to prove that $P$ is consistent.

Exercise 5.2:
The following boolean constraints define a digital circuit:
\[
y_1 = x_1 \oplus x_2, y_2 = x_2 \oplus x_3, y_3 = x_3 \oplus x_4, y_4 = x_4
\]
The following CSPs are instances of the given circuit, where
\[
\begin{align*}
(y_1 = x_1 \oplus x_2, y_2 = x_2 \oplus x_3, y_3 = x_3 \oplus x_4, y_4 = x_4; x_1 = 1, x_2 = 0, x_3 = 0, x_4 = 1) \\
(y_1 = x_1 \oplus x_2, y_2 = x_2 \oplus x_3, y_3 = x_3 \oplus x_4, y_4 = x_4; x_2 = 1, y_1 = 1, y_3 = 1, y_4 = 1)
\end{align*}
\]
a) Draw the digital circuit, where inputs are $x_1, x_2, x_3$ and $x_4$ and outputs are $y_1, y_2, y_3$ and $y_4$.

b) Show how to compute a successful derivation for the given instances yielding the values for all eight variables; at each step underline the selected constraint and give the used rule.

Hint: Use the XOR rules on slide V/11 or define alternative rules.