# Deduction Systems

## Tutorial 2

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### SS 2016

**Exercise 3.1.** One of the optimization techniques in tableaux procedures is absorption. What is the goal of applying this technique? Apply absorption to the TBox $\mathcal{T} = \{A \sqsubseteq B, B \equiv C \sqcap D, C \sqcap A \sqsubseteq E, D \sqcap E \sqsubseteq A\}$.

**Exercise 3.2.** Markus wants to apply the tableau algorithm for checking the satisfiability of the concept $B \sqcap \exists r^-.A$ w.r.t. the TBox $\{A \sqsubseteq \exists r^-.A \sqcap \exists r.B, \top \sqsubseteq\, \leqslant 1\, r\}$. He arrives at the situation depicted below and concludes that no further rules are applicable, since $v_2$ is blocked by $v_1$. What is Markus' error? Continue the algorithm until its termination. (You don't have to illustrate all intermediate steps, just provide the final state.)

$$
\begin{array}{l}
v_0 \\
r^- \downarrow \\
v_1 \\
r^- \downarrow \\
\quad v_2
\end{array}
\qquad
\begin{aligned}
L(v_0) &= \{B \sqcap \exists r^-.A, B, \exists r^-.A, C_{\mathcal{T}}, \neg A, \leqslant 1\, r\} \\
L(v_1) &= \{A, C_{\mathcal{T}}, \exists r^-.A, \exists r.B, \leqslant 1\, r\} \\
L(v_2) &= \{A, C_{\mathcal{T}}, \exists r^-.A, \exists r.B, \leqslant 1\, r\}.
\end{aligned}
$$