universität innsbruck

Logic	26S	LVA 703026 + 703027
Lecture 4		April 16, 2026

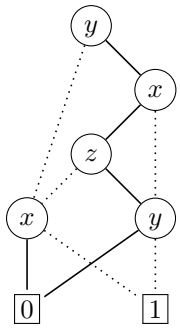
Solved exercises must be marked and solutions (as a single PDF file) uploaded in OLAT. The (strict) deadline is 7 am on April 16.

Exercises

⟨3⟩ 1. For each of the following sequents, either prove validity using natural deduction or explain why a natural deduction proof does not exist:
   (a) $p, r \to \neg p, \neg r \wedge s \to t, \neg t \vdash \neg s$
   (b) $p \to q \to r \vdash r \to q \to p$
   (c) $p \vdash (p \wedge q) \vee ((q \to \bot) \wedge (r \to p))$

⟨4⟩ 2. For each of the following clausal forms, use resolution to determine satisfiability:
   (a) $\{\{p\}, \{\neg p, q\}, \{\neg q, r\}, \{\neg p, \neg q, \neg r, \neg s\}\}$
   (b) $\{\{p\}, \{\neg q\}, \{\neg r, s\}, \{\neg s, q\}, \{q, r, \neg p, s\}, \{\neg q, r, \neg p, s\}\}$

⟨2⟩ 3. Consider the following BDD B:



   (a) Is B reduced? Is B ordered?
   (b) Which boolean function is represented by B?

⟨1⟩ 4. Compute a reduced OBDD for the boolean function $f(x, y, z) = x \oplus (\overline{y} + z)$ with the variable order $[x, y, z]$.