INF3170 / INF4171
Oblig 2

Deadline: November 20, 2014

Delivery

The solutions should be handed in electronically in Devilry (devilry.ifi.uio.no).
The deadline is November 20, 2014 at 23:59.

Problem 1

Define the concept "A is a logical consequence of Γ"

1. from the syntactic perspective of the proof system.

2. from the semantic perspective of models.

Problem 2

The LK calculus for first order logic contains the rule

$$\frac{\Gamma \;\vdash\; \Delta, \phi[a/x]}{\Gamma \;\vdash\; \Delta, \forall x \phi} \; \mathrm{R}\forall$$

where a is a parameter that does not occur in the conclusion. Prove that the
omission of this requirement on a makes LK unsound for first order logic.
    Do the same for L∃.

Problem 3

Make models and counter models for the sentences

$$\forall x, y \big(f(x) = f(y) \rightarrow x = y \big)$$
$$\forall x \big(f(x) \neq c \big).$$

Problem 4 (optional)

Find and prove general properties of models for the sentence

$$\forall x, y \big(f(x) = f(y) \to x = y \big) \wedge \forall x \big(f(x) \neq c \big).$$