# 4th Homework sheet Proof Theory

- Deadline: 23 November.
- Submit your solutions by handing them to the TA at the *beginning of the lecture*.
- Good luck!

In this exercise we work in intuitionistic propositional logic. The aim of this exercise is to give two proofs of the following fact:

> Let $C$ be a formula not containing $\rightarrow$ and $\Gamma = \{A_1 \rightarrow B_1, \ldots, A_n \rightarrow B_n\}$. If $\Gamma \vdash C$, then $\Gamma \vdash A_i$ for some $i \leq n$.

(a) *(50 points)* Give a semantic proof of this fact using Kripke models.

(b) *(50 points)* Give also a proof-theoretic argument using the sequent calculus *à la* Gentzen.