Automated Theorem Proving, SS 2014. Homework 5 (due April 29, 2014)

1. Prove in natural style that $(A \vee B) \Rightarrow C \;\models\; (A \Rightarrow C) \wedge (B \Rightarrow C)$.
2. Construct the sequent proof for the previous formula.
3. In the "$\neg\wedge$- calculus", prove the correctness of the following inference rules:

   (a) $$\frac{\Phi, \varphi_1, \varphi_2 \;\vdash\; \Psi}{\Phi, \varphi_1 \wedge \varphi_2 \;\vdash\; \Psi}\ (\wedge\vdash)$$

   (b) $$\frac{\Phi, \varphi \;\vdash\; \Psi}{\Phi \;\vdash\; \neg\varphi, \Psi}\ (\vdash\neg)$$

4. Using the "$\neg\wedge$- calculus", derive the sequent rules for
   (a) disjunction in the assumption
   (b) disjunction in the goal
   (c) implication in the assumption
   (d) implication in the goal