Automated Theorem Proving, SS 2016. Homework 3 (due April 20, 2016)

More exercises will be added tomorrow, April 18 2016.

0. Remaining exercises from previous homework.

1. Construct the sequent proof (proof tree) for $(A \vee B) \Rightarrow C \models (A \Rightarrow C) \wedge (B \Rightarrow C)$.

2. Construct the inference tree for $(A \vee B) \Rightarrow C \models (A \Rightarrow C) \wedge (A \Rightarrow C)$.

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