Logic 1, WS 2006. Homework 5, given Nov 30, due Dec 7

1. Construct a proof of the sequent:

$$A \vee B,\ \neg A \vee C \quad \vdash \quad B \vee C,$$

by using the sequent rules duscussed in the lecture.

2. Show by resolution that the following set of clauses in unsatisfiable:
$\{A \vee B,\ \overline{A} \vee B,\ A \vee \overline{B},\ \overline{A} \vee \overline{B}\}$.

3. Consider the theorem:

$$A \vee B \vee C,\ C \Rightarrow (A \vee B),\ A \Rightarrow (B \vee C),\ (A \wedge B) \Rightarrow C \quad \models \quad (\overline{A} \wedge B) \vee (A \wedge C).$$

Construct the refutation formula corresponding to this theorem (The refutation formula of $\phi_1, \ldots, \phi_n \models \psi$ is $\phi_1 \wedge \ldots \phi_n \wedge (\neg\psi)$) and the set of clauses corresponding to it.

4. Show by resolution that this set of clauses is unsatisfiable.

5. Use the Davis-Putnam procedure in order to show that the set of clauses from the previous example is unsatisfiable.