Exercise Sheet 6
CS 2210 Logic for Computer Scientists (Hitzler)
Solutions due: Tuesday October 14, 2014, 9:30am

Exercise 33 Express modus tollens, modus tollendo ponens, and modus ponendo tollens in propositional logic.

Exercise 34 Show, using truth tables, that the modi from Exercise 33 are valid.

Exercise 35 For P the Datalog program from Exercise 9, determine $v(P)$.

Exercise 36 Translate the "secrets" of the centenarian (slide 13 of the slideset from the first session) into formulas, where B stands for *beer for dinner*, F for *fish for dinner* and I for *ice cream for dinner*.

Exercise 37 Show that the claim on slide 13 holds.

Exercise 38 Transform $\neg((A \vee B) \wedge (C \vee D) \wedge (E \vee F))$ into CNF.

Exercise 39 Give a CNF for the formula F in Remark 2.5.7.

Exercise 40 (no hand-in) Show by structural induction: For any formula F (with all brackets written), we have $b(F) \leq c(F)$, where $b(F)$ is the number of all opening brackets in F, and $c(F)$ is the number of all connectives in F.

Exercise 41 (no hand-in) Show the following: For all formulas F_i ($i = 1, 2, 3$), $F_1 \vee (F_2 \wedge F_3)$ and $(F_1 \vee E) \wedge (E \leftrightarrow (F_2 \wedge F_3))$ are equisatisfiable (E is a propositional variable not occurring in F_1, F_2, F_3).