

Exercise Sheet 8
CS 2210 Logic for Computer Scientists (Hitzler)
Solutions due: Tuesday March 17, 2015, 11am

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).

Exercise 42 Give a complete tableau for $(\neg p \wedge \neg q \wedge \neg r) \vee (p \wedge \neg q \wedge \neg r)$.

Exercise 43 Is

$$((p \wedge q) \vee (p \wedge \neg q)) \wedge \neg(\neg r \wedge p)$$

valid? satisfiable? unsatisfiable?

Exercise 44 Do the same as in Example 2.6.9 for Modus Tollens.

Exercise 45 Show $\{A \rightarrow (B \rightarrow C)\} \models (A \rightarrow B) \rightarrow (A \rightarrow C)$ using the tableaux algorithm.