PROPOSITIONAL LOGIC – REVIEW SET 1
CSC 335

PROFESSOR TROEGER

Again, I strongly recommend David Liben-Nowell's excellent text, Discrete Mathematics for Computer Science. These problems are from his Chapters 3 and 5. Both can be solved using structural induction.

(1) Prove that each proposition defined using the connectives $\wedge, \vee, \neg$ and $\implies$ is logically equivalent to a proposition defined using only $\wedge$ and $\neg$.

(2) Let us say that a *literal* is a Boolean variable or the negation of a Boolean variable. (So p and $\neg p$ are both literals.) A proposition is in *conjunctive normal form* if it is the conjunction of one or more *clauses*, where each clause is the disjunction of one or more literals. For example, $(\neg p \vee q \vee r) \wedge (\neg q \vee \neg r) \wedge (r)$ is in conjunctive normal form. Prove that each proposition defined using the connectives $\wedge, \vee, \neg$ and $\implies$ is logically equivalent to a proposition in conjunctive normal form.

Date: September 15 2020.