

CSE 6321 - Problem Set 3

Due beginning of lecture on February 25th

Problem numbers are from the third edition of Sipser's book. If unsure about which problem to solve, ask. Collaboration is permitted; looking for solutions from external sources (books, the web, material from previous years, etc.) is prohibited. Printed version is preferred, otherwise please make sure your handwriting is readable.

1. Let $coNP$ be the class of languages whose complement is in NP . Show that $P \subseteq NP \cap coNP$. Show that if $P = NP$ then $P = coNP$. (Warning: $coNP$ is *not* the complement of NP .)
2. Say that two Boolean formulas are equivalent if they have the same set of variables and are true on the same set of assignments to those variables (i.e., they describe the same Boolean function). A Boolean formula is *minimal* if no shorter Boolean formula is equivalent to it. Let MIN-FORMULA be the collection of minimal Boolean formulas. Show that, if $P = NP$, then $MIN-FORMULA \in P$.
3. 7.7
4. 7.12