

Discussion – Wednesday, December 9, 2020

Problems

1. Give a language B (if it exists) such that
 - (a) $B \leq_P SAT$ and B is not NP-complete.
 - (b) $SAT \leq_P B$ and B is not NP-complete.
 - (c) $SAT \leq_P B$ and B is not NP-hard.
 - (d) B is regular and NP-complete.
2. Let $USAT = \{\langle \phi \rangle \mid \phi \text{ is a Boolean formula that has exactly one satisfying assignment}\}$.
 - (a) Show that $USAT \in PSPACE$.
 - (b) Give a polynomial-time reduction from $USAT$ to $TQBF$.
 - (c) Using the assumption that $P = NP$, give a polynomial time algorithm for $USAT$.