Theory of Computer Science

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Exercise meeting 10

Exercise 10.1

The following statements are all wrong. In each case, explain in 1–2 sentences why the statement is wrong and what a correct version would be.

(a) To show that a problem X is NP-complete, it suffices to show that $X \in \text{NP}$ and $X \leq_\text{p} Y$ for some NP-complete problem Y.

(b) There is an NP-complete problem X that can be solved with an efficient deterministic algorithm, even if there is none for Sat.

(c) For every NP-hard problem X: $X \leq_\text{p} \text{Sat}$.

(d) If there is a problem $X \in \text{P}$ such that $X \leq_\text{p} Y$ for some NP-complete problem Y then $\text{P} = \text{NP}$.