

Problem Set 7

This problem set is due at **10:00 am** on **Tuesday, April 18th**.

Problem 7- 1: Reductions

In $SAT(10)$ the input is a Boolean formula φ in which each variable appears in at most 10 clauses. The problem is to decide whether φ is satisfiable. Show a polynomial-time reduction from $3SAT$ to $SAT(10)$.

Problem 7- 2: Reductions and algorithms

Suppose that one can decide $3SAT$ in polynomial time. Show that given a Boolean formula φ one can find the satisfying assignment for φ , if such exists, in polynomial time. If φ is unsatisfiable, the algorithm should declare so.

Hint: Given a Boolean formula and a variable, consider the formula where the variable is substituted TRUE and another formula where the same variable is substituted FALSE.