

Exercise 9.9. Consider the following special case of SAT, which we will call *k-occurrence-SAT* for a fixed parameter $k \in \mathbb{N}$. The input consists of a SAT formula $f(x_1, \dots, x_n)$ in CNF such that every variable x_i appears (as is, or negated) in at most k clauses. The problem is to decide whether there is a satisfying assignment. For $k = 3$, either (a) design and analyze a polynomial time algorithm, or (b) show that a polynomial time algorithm for *k-occurrence-SAT* implies a polynomial time algorithm for (CNF-)SAT.¹

¹As a warmup, it might be helpful to first consider the case $k = 5$. If you figure out 5-occurrence SAT, but don't figure out 3-occurrence SAT, we will give partial credit for a solution to 5-occurrence SAT.

Solution. solution

□