The Theory of Computation

Bernard M.E. Moret

Addison-Wesley-Longman, 1998

Solution Manual
Chapter 7, Problem 7.43

In reviewing our proof of Cook's theorem (Theorem 6.6, pp. 203–207), we note that each of the variables we defined must take on a unique value in any assignment that reflects a particular ID of the simulated Turing machine, with the single exception of the variables that define the contents of the tape to the left of the head at step 0. Thus the number of distinct truth assignments that satisfy the entire collection of clauses is exactly the number of distinct certificates that lead to acceptance. In other words, our construction is (strictly) parsimonious. Thus counting the number of distinct satisfying truth assignments is indeed #P-complete.