

Problem of the Week – 6

Extracting solutions from decision algorithms

In our development of complexity theory, we have focused on decision problems, where we only seek answers to “yes/no” questions. More often, we are interested in finding the actual solution that leads to a “yes” answer. In this problem, we consider extracting solutions from decision algorithms.

- Given a polynomial-time algorithm for deciding whether a Boolean formula is satisfiable, describe a polynomial-time algorithm that, given a Boolean formula ϕ , actually produces a satisfying assignment for ϕ if ϕ is satisfiable.
- Given a polynomial-time algorithm for deciding whether a directed graph has a Hamiltonian path, describe a polynomial-time algorithm that, given a directed graph G , actually produces a Hamiltonian path of G if it exists.