The Theory of Computation
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Solution Manual
Chapter 7, Problem 7.6

The hint suggests recasting the problem before attempting to prove NP-easiness, because direct self-reduction in the original terms appears to fail. The goal of any test set is to separate every pair of classes that can be separated. (Indeed, we can assume that all classes in the given instance can be separated; otherwise, we can discard all but one of the classes in each inseparable group.) We can thus take the view that every pair of classes forms an element to be handled by at least one test and that each test can be characterized by the pairs that it can separate. This is the description of a set cover problem! It is also a description that lends itself to self-reduction: after selecting a test, the remaining instance has one fewer test and has "lost" all of the pairs covered by that test. With this step in mind, NP-easiness is easily proved in the "usual" manner: use binary search to derive the cost of the optimal solution, then attempt to include each test in turn as the first test in the set, asking for each attempt whether there exists a solution of optimal cost containing this test; once the first test has been selected, repeat the iteration to obtain the second, third, etc. tests.