The Theory of Computation

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Solution Manual

Chapter 7, Problem 7.4

That the problem is in NP requires a bit of thought: it is not enough to specify what the vertices of G that make up the isomorphic copy of H happen to be, since we do not know how to test for isomorphism in polynomial time. However, the certificate can give both the selected vertices of G and, for each such vertex, the vertex of H to which it corresponds; verifying the isomorphism is now a linear-time operation. We restrict the problem to *Clique* (with graph G and parameter k) by using G unchanged and restricting H to be the complete graph on k vertices—i.e., to be a clique of k vertices. Since a clique of $k' > k$ vertices contains a clique of k vertices and since two complete graphs on k vertices are automatically isomorphic, our conclusion follows.