4005-800 Algorithms

Homework 7

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PROBLEM 1 - 34.2-1. *Consider the language GRAPH-ISOMORPHISM* $= \{\langle G_1, G_2\rangle : G_1$ *and* G_2 *are isomorphic graphs* $\}$. *Prove that GRAPH-ISOMORPHISM* $\in NP$ *by describing a polynomial-time algorithm to verify the language.*

Solution.

PROBLEM 2 - 34.2-10. *Prove that if* $NP \neq$ *co-*NP*, then* $P \neq NP$.

Solution.

PROBLEM 3 - 34.3-1. *Verify that the circuit in Figure* 34.8(b) *is unsatisfiable.*

Solution.

PROBLEM 4 - 34.4-5. *Show that the problem of determining the satisfiability of boolean formulas in disjunctive normal form is polynomial-time solvable.*

Solution.

PROBLEM 5 - 34.5-5. *The* ***set-partition problem*** *takes as input a set* S *of numbers. The question is whether the numbers can be partitioned into two sets* A *and* $A' = S - A$ *such that* $\sum_{x \in A} x = \sum_{x \in A'} x$. *Show that the set-partition problem is* NP*-complete.*

Solution.