

Exercise sheet 8, CompComp, Spring 2016

Please return Friday May 6 in class

Problem 1. Claim: $\text{SPACE}(1) = \text{TIME}(1)$. Prove or disprove.

Problem 2. A *linear-time reduction* R must complete its output $R(x)$ in time $O(|x|)$. Show that there are no **P**-complete problems under linear-time reductions. *Hint: make use of the time hierarchy theorem.*

Problem 3. The problem SET PACKING has instances consisting of a finite collection C of finite sets and of a positive integer $K \leq |C|$. The question to be decided is whether C contains at least K disjoint sets. – The problem CLIQUE has instances consisting of an undirected graph $G = (V, E)$ and a positive integer $K \leq |V|$. The question to be decided is whether G contains a *clique* of size at least K , that is, a subset $V' \subseteq V$ such that every two vertices in V' are joined by an edge in E . Reduce SET PACKING to CLIQUE. Don't forget to demonstrate that your reduction can be done in polynomial time!