

## Homework 6

CS 450  
Winter 1999  
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1 Prove that  $\leq_m$ -reducibility is reflexive and transitive, but not symmetric or anti-symmetric, i.e., prove the following theorems:

- a) **Theorem.**  $\forall L, L \leq_m L$ .
- b) **Theorem.**  $\forall L_1, L_2, L_3, L_1 \leq_m L_2 \text{ and } L_2 \leq_m L_3 \implies L_1 \leq_m L_3$ .
- c) **Theorem.**  $\exists L_1, L_2, L_1 \leq_m L_2 \text{ and } L_2 \not\leq_m L_1$ .
- d) **Theorem.**  $\exists L_1, L_2, L_1 \leq_m L_2 \text{ and } L_2 \leq_m L_1 \text{ and } L_1 \neq L_2$ .