Problem Set 3 — Due January 25, 2005

Problem 1. Let $L = \{w : w$ is a binary string of length at least 1 that starts and ends with the same character$\}$. Show that 5 states is necessary and sufficient for a DFA to recognize $L$.


Problem 3. Page 90, Problem 1.41.

Problem 4. Prove that the DFA-acceptable languages are closed under reversal.

Problem 5. Find a simple and nontrivial characterization of the language $\{111\}^* \{1111\}^*$ and prove correct your characterization.

Problem 6. (For whiz-kids only—no soln to be given—turn in correct soln directly to Prof. Rogaway)

Prove that if $L \subseteq \{1\}^*$ then $L^*$ is regular.