CSE 322: Introduction to Formal Models in Computer Science
Assignment #5
May 6, 1998
due: Wednesday, May 13

1. Exercise 2.4.2
2. Exercise 2.4.12
3. Exercise 2.4.3(f)
4. Consider the language

   $$L = \{a^m c^n b^{m+n} \mid m \text{ and } n \text{ are nonnegative integers}\}$$

   over the alphabet $\Sigma = \{a, b, c\}$. Prove that L is not regular without using the pumping lemma. (Hint: Argue by contradiction, and use the fact that the regular languages are closed under intersection, together with some previous language already proved to be nonregular.)
5. Let M be the deterministic finite automaton given by the following state diagram:

   Use the state minimization algorithm to find an equivalent deterministic finite automaton that has as few states as possible. Show the equivalence classes of the intermediate equivalence relations $\equiv_0, \equiv_1, \ldots$ Present the minimized deterministic finite automaton by its state diagram.