

This homework covers section 3.4. It is due in class Wednesday, March 27 (along with the regular expressions lab). Hand in a hardcopy of your solutions.

While you may discuss problems with other students, you should always make the first attempt on a problem yourself and **you must write up your own solutions in your own words**. You may not collaboratively write solutions or copy a solution that one person in the group writes up.

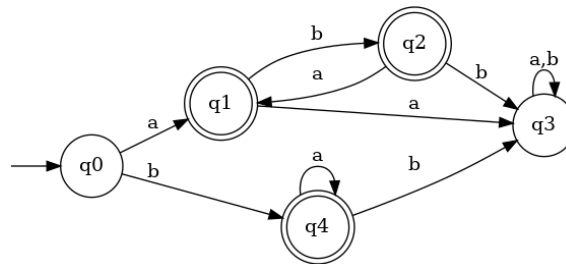
1. Let DFA $M = \{Q, \Sigma, p_1, \delta, F\}$ where

$$Q = \{p_1, p_2, p_3, p_4\}, \quad \Sigma = \{a, b, c\}, \quad F = \{p_2, p_4\},$$

and δ is given by the table below.

	p_1	p_2	p_3	p_4
a	p_2	p_2	p_3	p_3
b	p_4	p_3	p_3	p_4
c	p_1	p_3	p_3	p_4

- (a) Draw a transition diagram for M .
- (b) Based on the diagram, find a regular expression for the language that is accepted by M . Explain your reasoning.
2. Consider the DFA M defined by the transition diagram shown below.



- (a) Let $M = \{Q, \Sigma, q_0, \delta, F\}$. Identify Q , Σ , δ , and F . For δ , give the transition table.
- (b) Find a regular expression for the language that is accepted by M . Explain your reasoning.

3. For each of the following languages, draw a transition diagram for a DFA that accepts that language, that is, it accepts all the strings in the language and no other strings. Note the alphabet in each case — the alphabet for the DFA should be the same as the alphabet for the language.
- (a) $\{w \in \{a, b\}^* \mid w \text{ ends with the string } abab\}$
 - (b) $\{w \in \{a, b, c\}^* \mid w \text{ contains a } c \text{ and there are no } a\text{s after the first } c\}$
 - (c) $\{w \in \{a, b, c\}^* \mid n_a(w) + n_b(w) \text{ is a multiple of } 3\}$