Chapter 2 Homework
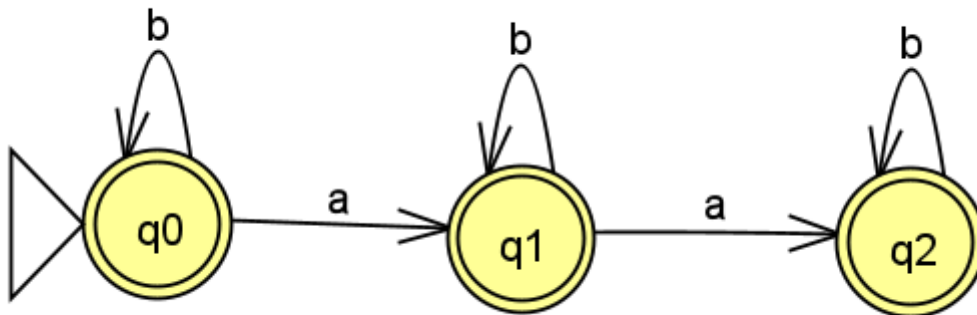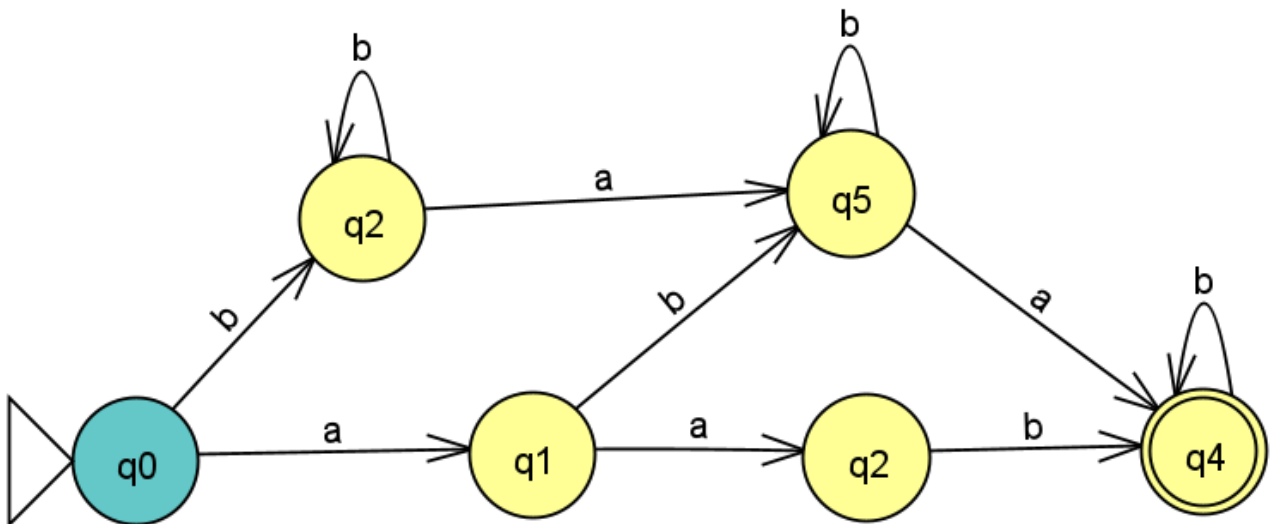
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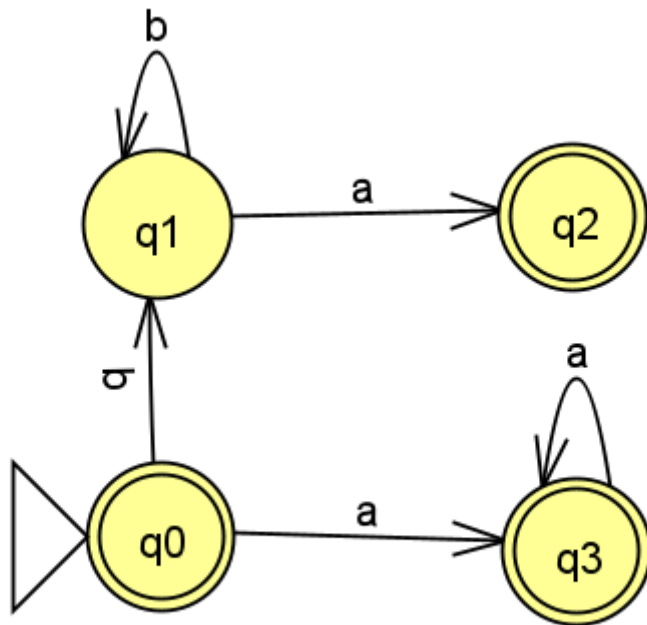## 1. For Σ = {a, b}, construct dfa's that accept the sets consisting of

(a) all strings with no more than two a's.

(b) all strings with at least one b and exactly two a's. (hint: label the state by a two-digit number such that the first digit represents the number of a's and the second digit represents the number of b's.)

2. Find an nfa with four states for L = {an : n ≥ 0} ∪ {b^na : n≥1}.
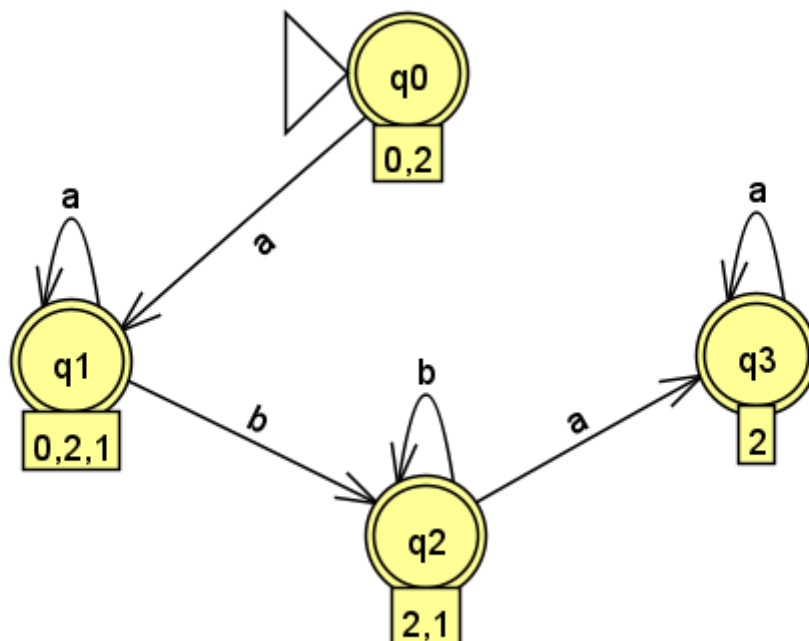
3. Convert the nfa defined by
   $\delta(q0, a) = \{q0, q1\}$
   $\delta(q1, b) = \{q1, q2\}$
   $\delta(q2, a) = \{q2\}$
   $\delta(q0, \lambda) = \{q2\}$
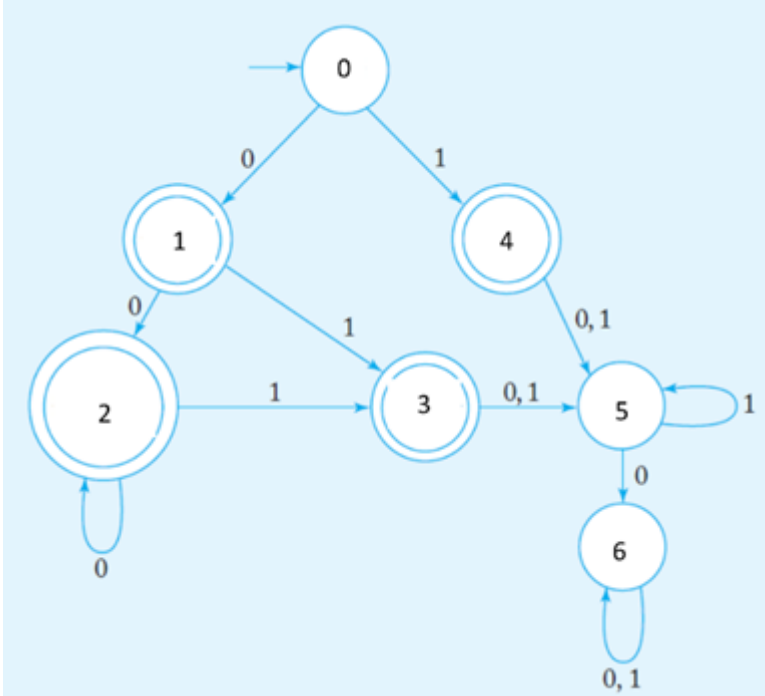   with initial state q0 and final state q2 into an equivalent dfa.

4. Show that if L is regular, so is LR.

Let L be recognized by an fsa A. Turn A into an fsa for L R , by:

1. Reversing all arcs.

2. Make the old start state the new sole accepting state.

3. Create a new start state p 0 , with δ(p 0, ϱ) = F (the old accepting states).

5. Given the following dfa:

Find a minimal equivalent dfa.