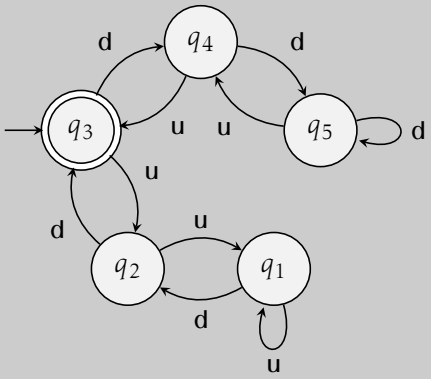
1.3 The formal description of a DFA M is ($\{q_1, q_2, q_3, q_4, q_5\}$, $\{u, d\}$, δ, q_3, $\{q3\}$) where δ is given by the following table. Give the state diagram of this machine.

	u	d
q_1	q_1	q_2
q_2	q_1	q_3
q_3	q_2	q_4
q_4	q_3	q_5
q_5	q_4	q_5

Solution.

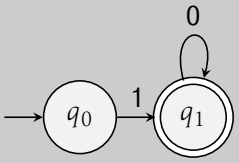


■

1.6 Give state diagrams of DFAs recognizing the following languages. In all parts, the alphabet is $\{0, 1\}$

(a) {w| w begins with a 1 and ends with a 0 }

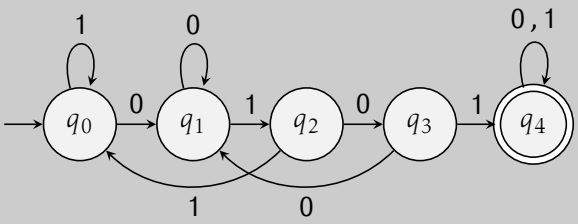
Solution.



■

(c) {w| w contains the sub-string 0101 (i.e., w = x0101y for some x and y }

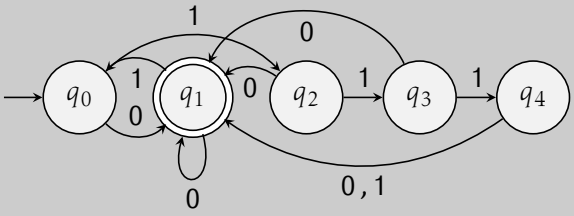
Solution.



■

(h) {w| w is any string except 11 and 111 }

Solution.

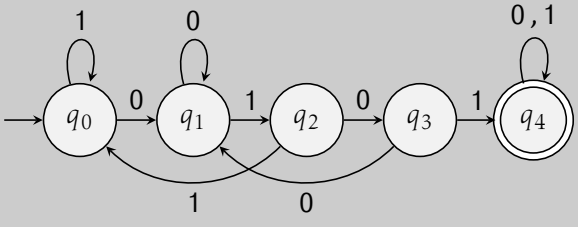


■

1.7 Give state diagrams of NFAs with the specified number of states recognizing each of the following languages. In all parts, the alphabet is {0,1}.

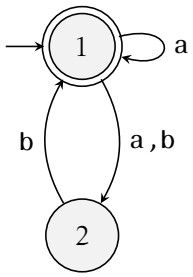
(b) The language of Exercise 1.6c with five states

Solution.



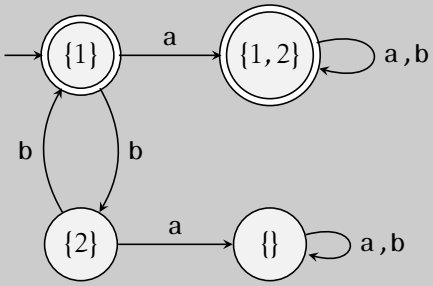
■

1.16 Use the construction given in Theorem 1.39 to convert the following two nondeterministic finite automata to equivalent deterministic finite automata.

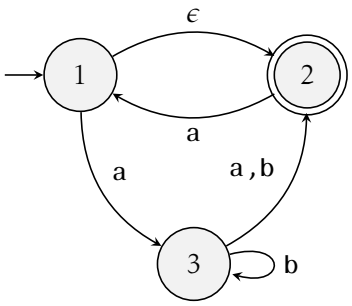


(a)

Solution.

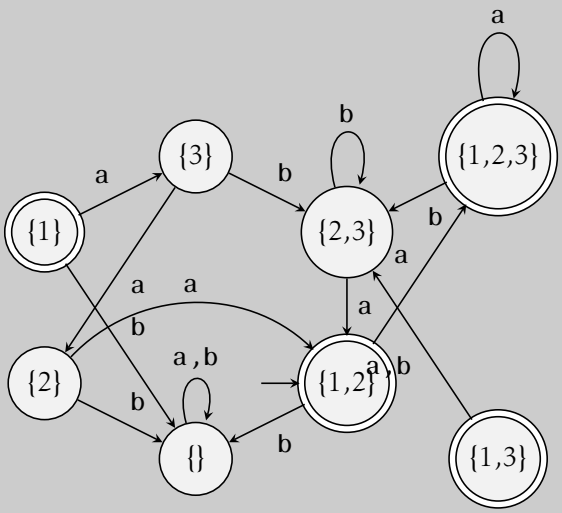


■



(b)

Solution.


a
b
{3}
{1,2,3}
a
b
{1}
{2,3}
b
a
a
a
b
a,b
{2}
{1,2}
a,b
b
b
{}
{1,3}

■