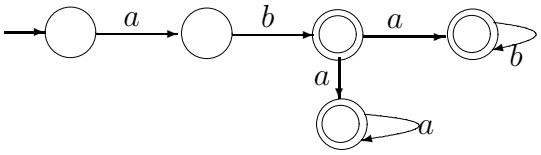
Theory of Algorithms. Spring 2000. Homework 3 Solutions.

Section 2.2

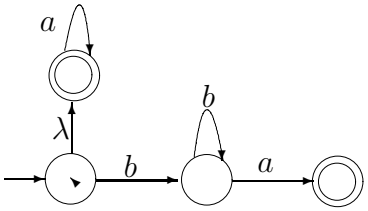
(3) $\delta^*(q_0, a) = \{q_0, q_1, q_2\}$. $\delta^*(q_1, \lambda) = \{q_0, q_1, q_2\}$.

(4) $\delta^*(q_0, 1010) = \{q_0, q_2\}$. $\delta^*(q_1, 00) = \emptyset$.

(5)

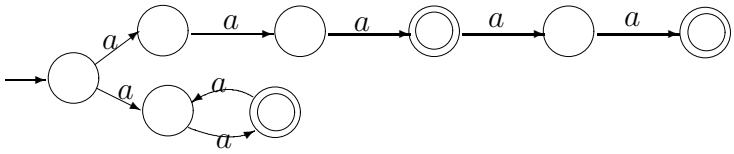


(8)



(9) 01001, 000 are accepted. **(10)** $\{\lambda\}$

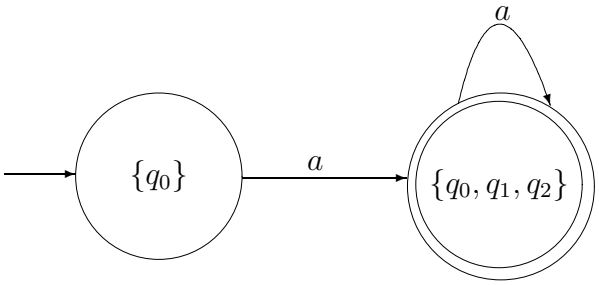
(11)



(12) $\{\, 0^{2n+1} \mid n \geq 0 \,\} \cup \{\, w10^{2n} \mid w \in \{0,1\}^* \wedge n \geq 0 \,\}$.

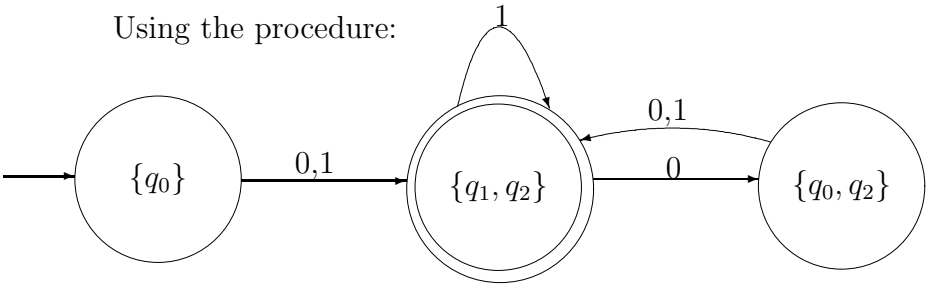
section 2.3

(1)

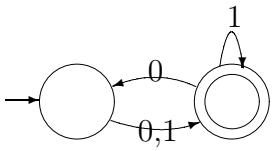


(2)

Using the procedure:

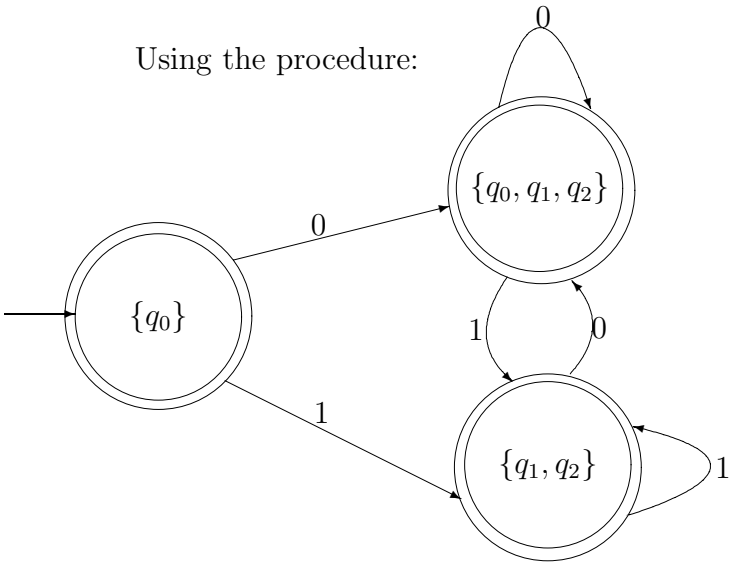


Finding the dfa by thinking about the language:

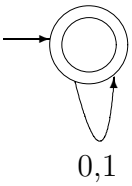


(3)

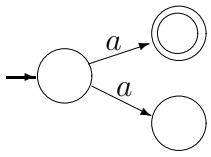
Using the procedure:



thinking about the language:



(5) Yes. This is true becuase $\{\, w \in \Sigma^* \,:\, \delta^*(q_0, w) \cap F = \emptyset \,\}$ is the compliment of $\{\, w \in \Sigma^* \,:\, \delta^*(q_0, w) \cap F \neq \emptyset \,\} = L(M)$.

(6) No. For example consider 

In this nfa $\delta^*(q_0, a) \cap (Q - F) \neq \emptyset$.

But $a \notin \overline{L(M)}$ because $a \in L(M)$.