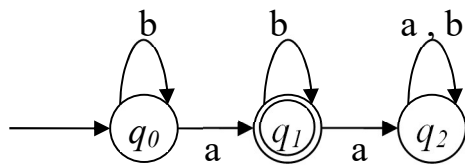


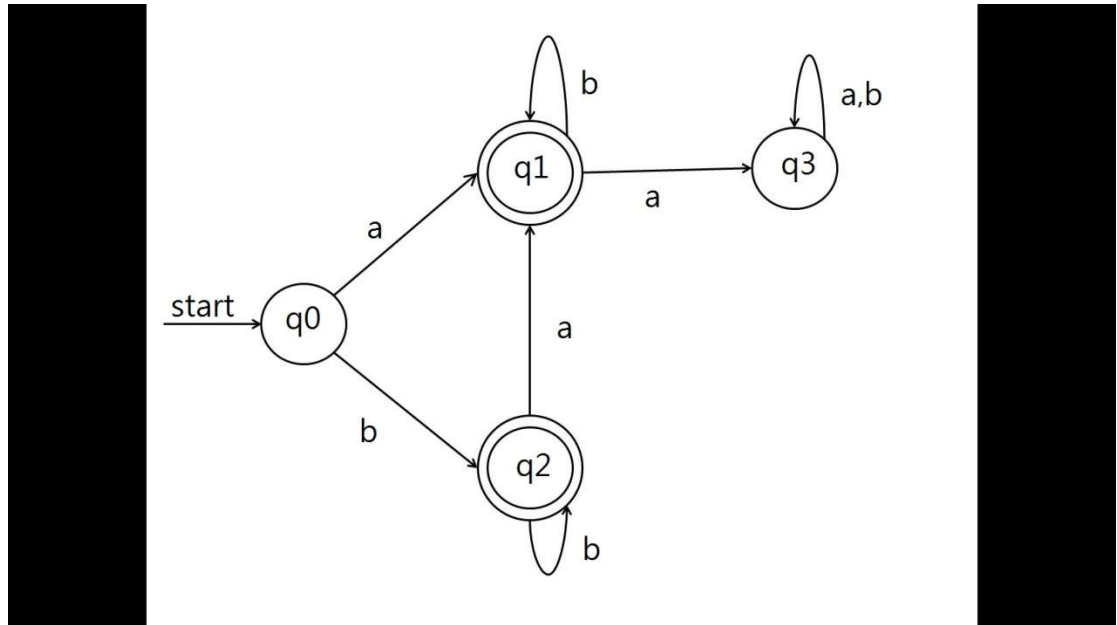
Q1.

(a)

Solution 1:

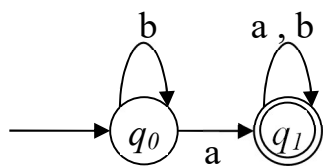


Solution 2:

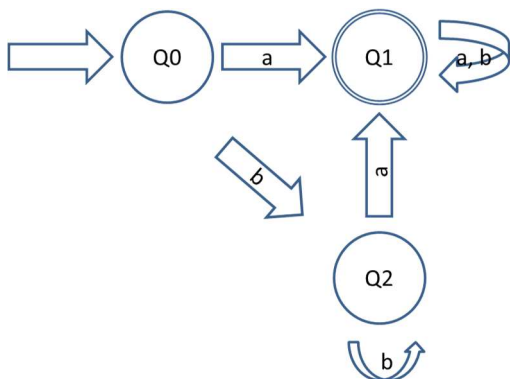


(b)

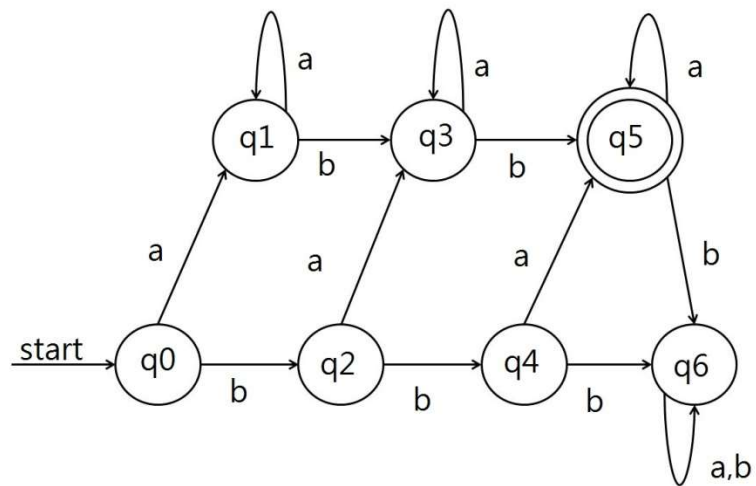
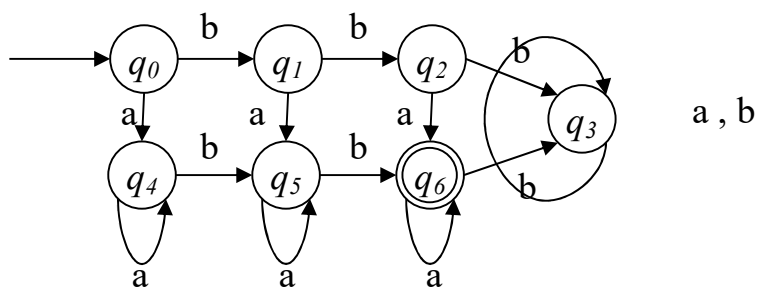
Solution 1:



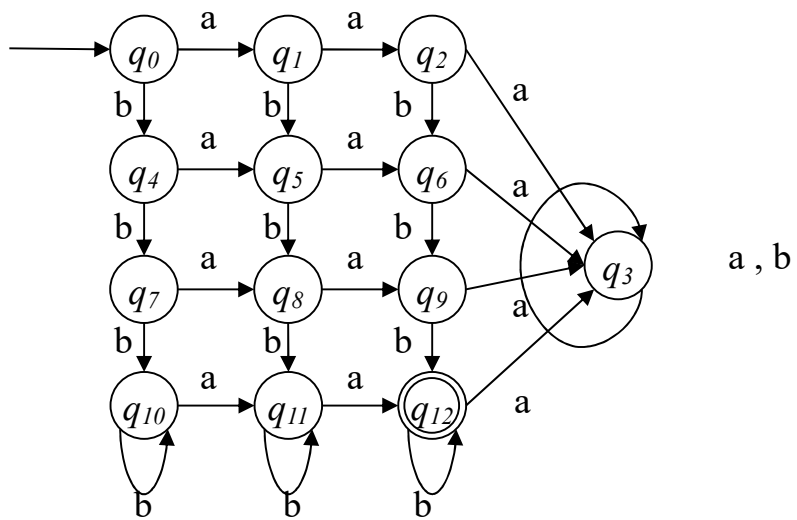
Solution 2:



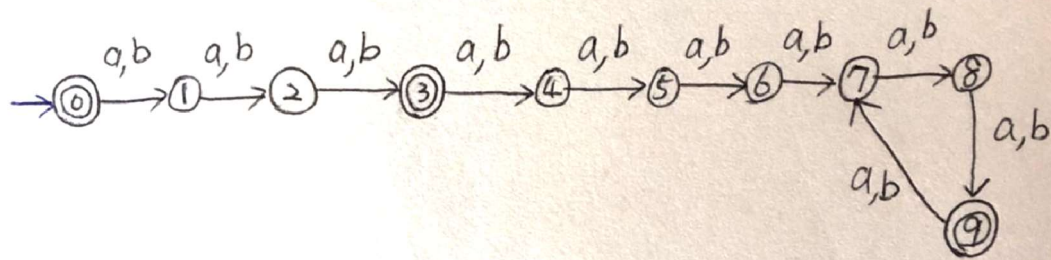
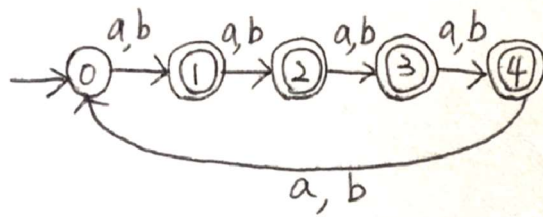
(c)



(d)



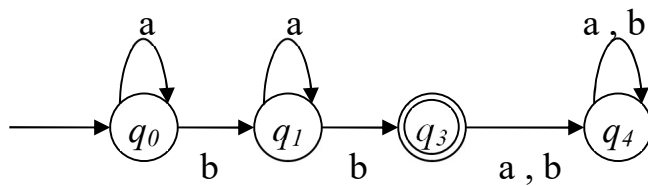
Q2.



Q3.

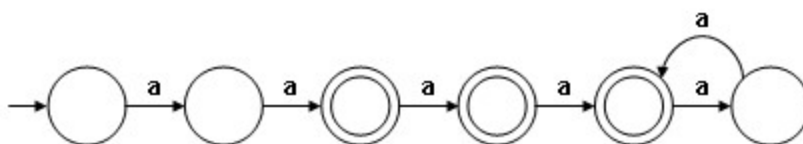
$$L = \{a^n b : n \geq 0\}$$

$$L^2 = \{a^n b a^m b : n, m \geq 0\}$$



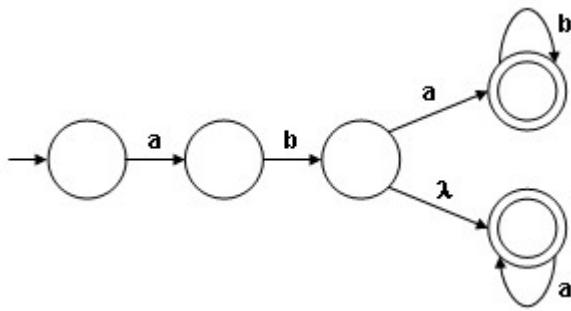
This DFA exist, so L^2 is regular.

Q4.

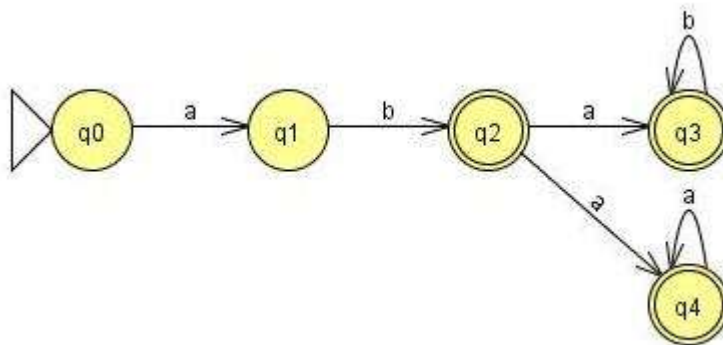


Q5.

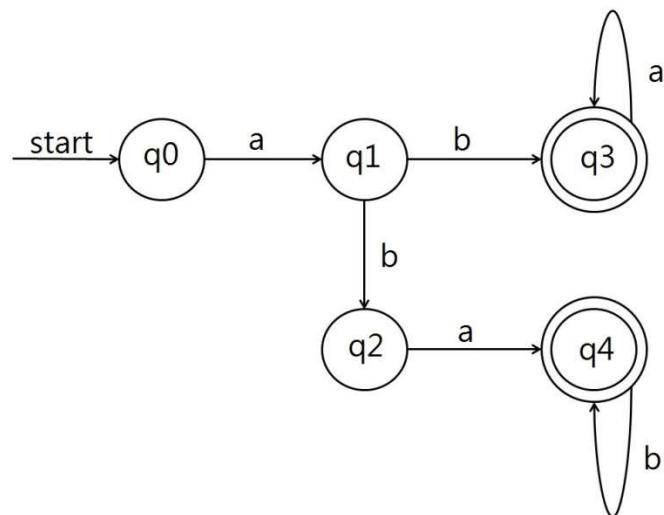
Solution 1:



Solution 2:

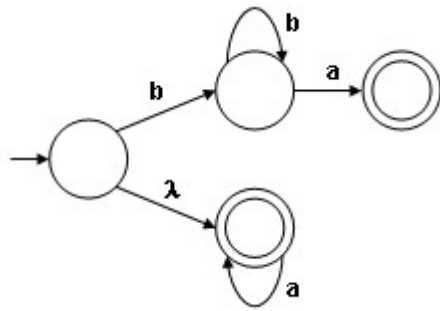


Solution 3:

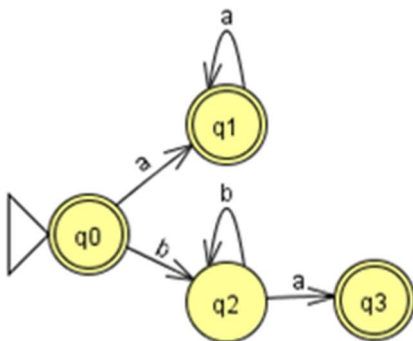
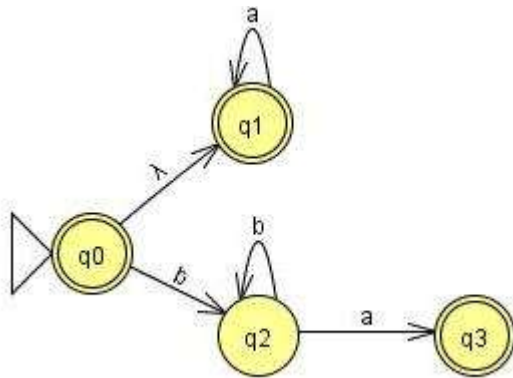


Q6.

Solution 1:

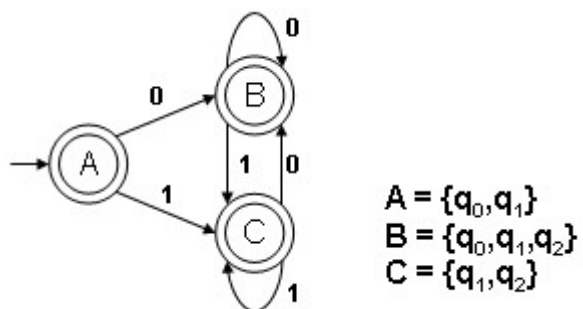


Solution 2: (can also change the transition of $q_0 \rightarrow q_1$, as 'a')



Q7.

Solution 1:



Solution 2:

Convert the following NFA into an equivalent DFA.

Transition states	0	1
{q0}	{q0, q1, q2}	{q1, q2}
{q1, q2}	{q0, q1, q2}	{q1, q2}
{q0, q1, q2}	{q0, q1, q2}	{q1, q2}

由於 3 個 state 的轉換結果都一樣 故可化簡成 1 個 state

