CMPS 130 Homework 2

Textbook Exercises

1.1

	M_1	M_2
a.	q_1	q_1
b.	$\{q_2\}$	$\{q_1, q_4\}$
c.	q_1, q_2, q_3, q_1, q_1	q_1, q_1, q_1, q_2, q_4
d.	No	Yes
e.	No	Yes

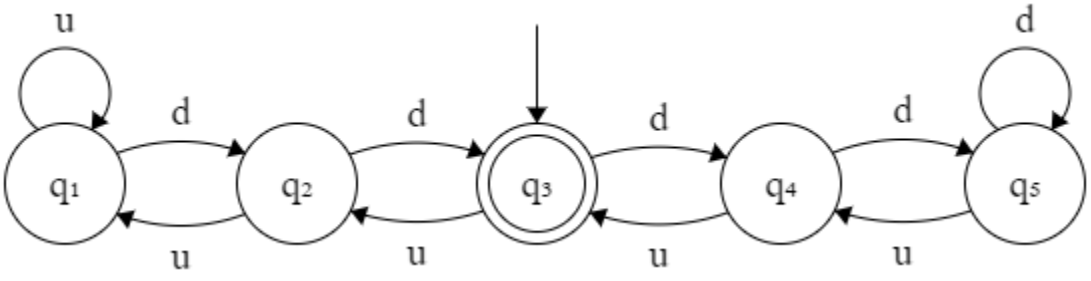
1.2

	$M_1 = (Q, \Sigma, \delta, s, F)$	$M_2 = (Q, \Sigma, \delta, s, F)$
Q	$\{q_1, q_2, q_3\}$	$\{q_1, q_2, q_3, q_4\}$
Σ	{a, b}	{a, b}
δ		
s	q_1	q_1
F	$\{q_2\}$	$\{q_1, q_4\}$

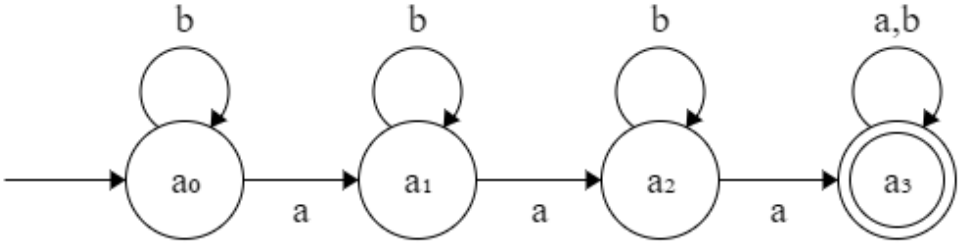
	a	b
q_1	q_2	q_1
q_2	q_3	q_3
q_3	q_2	q_1

	a	b
q_1	q_1	q_2
q_2	q_3	q_4
q_3	q_2	q_1
q_4	q_3	q_4

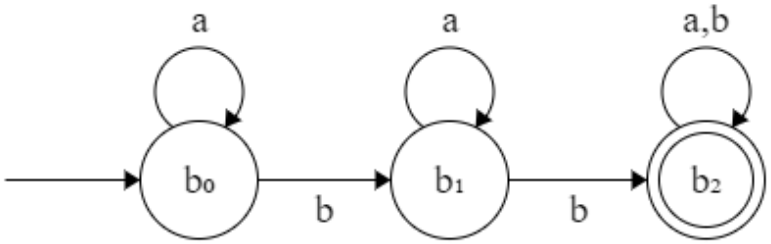
1.3



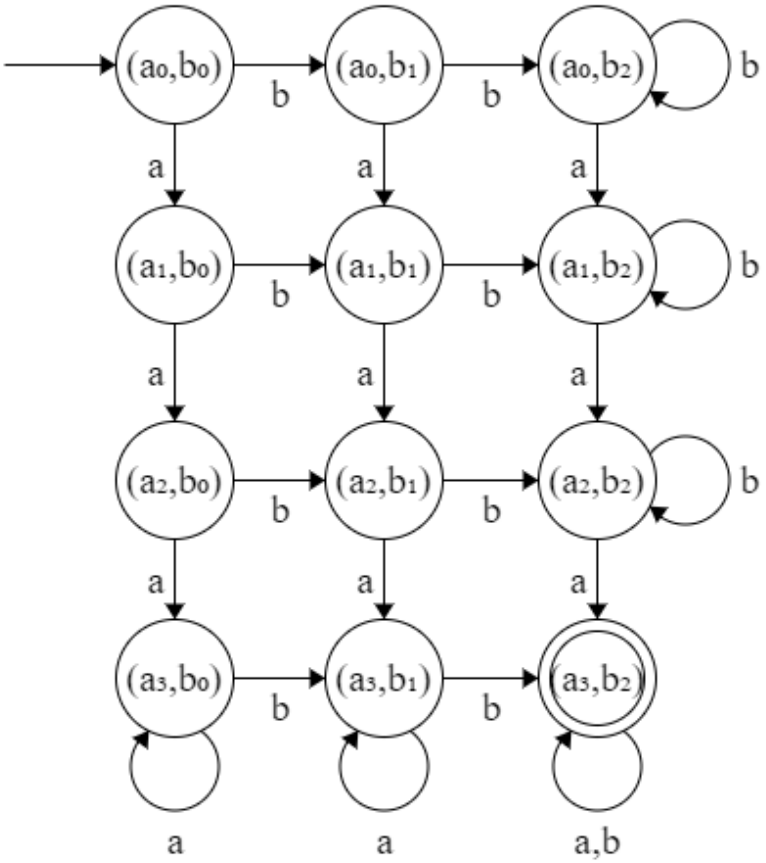
1.4 a. {w| w has at least 3 a′s}



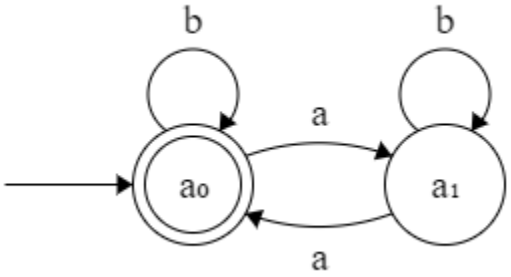
{w| w has at least 2 b′s}



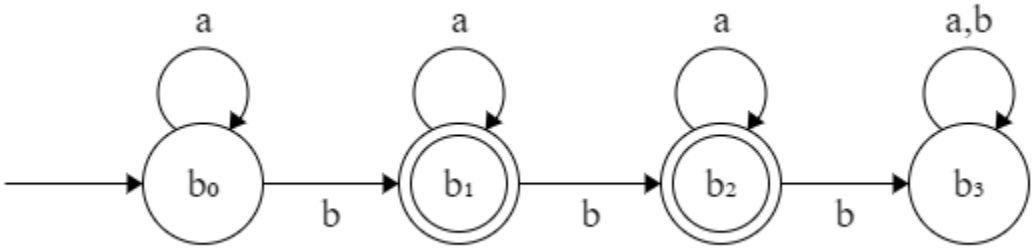
{w| w has at least 3 a′s and 2 b′s}



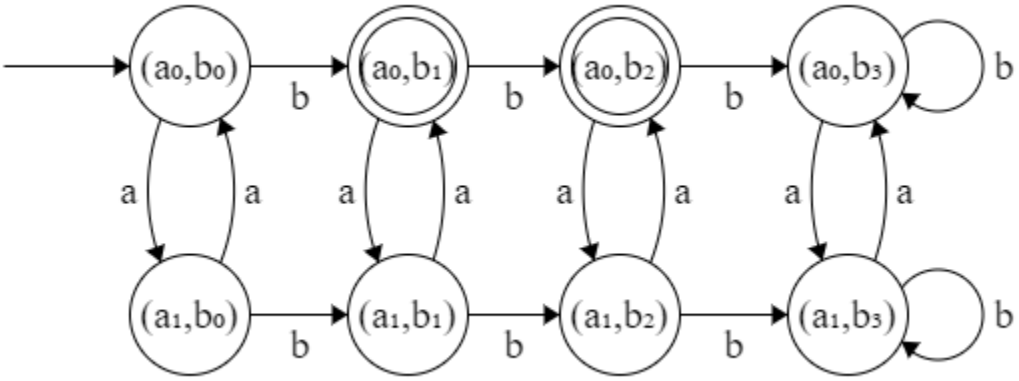
1.4 c. {w| w has an even number of a′s}



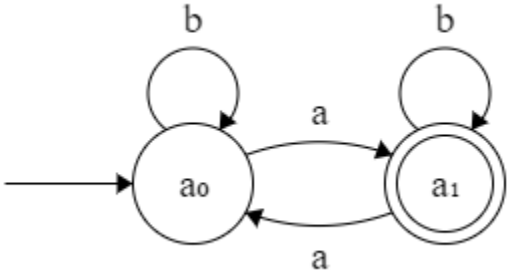
{w| w has 1 or 2 b′s}



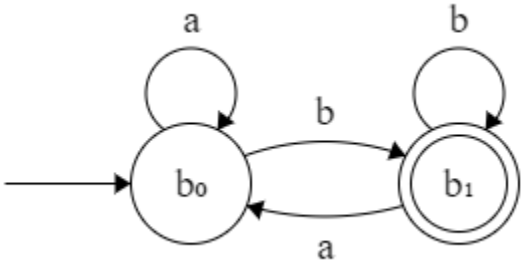
{w| w has an even number of a′s and 1 or 2 b′s}



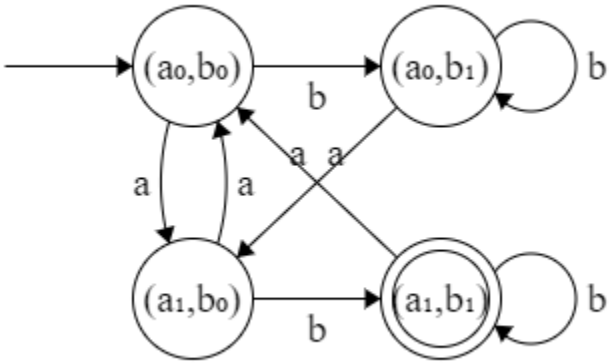
1.4 f. {w| w has an odd number of a′s}



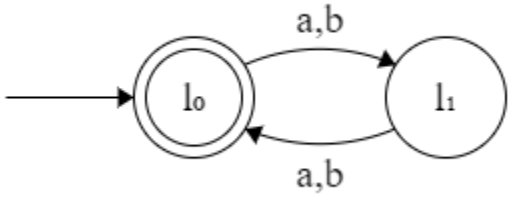
{w| w ends with a b}



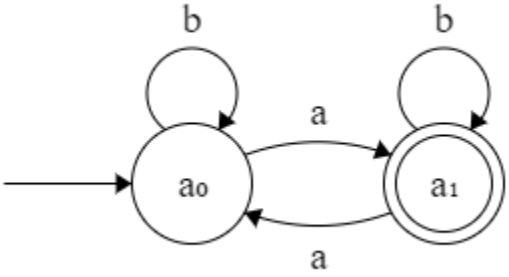
{w| w has an odd number of a′s and ends with a b}



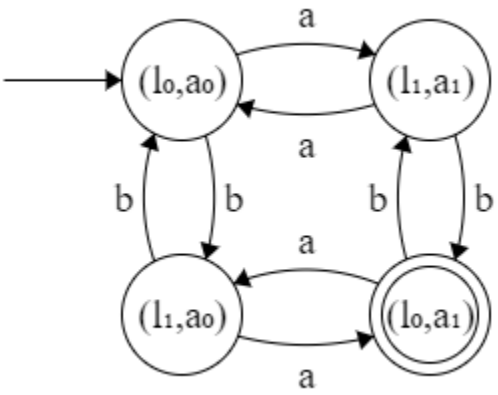
1.4 g. {w| w has an even length}



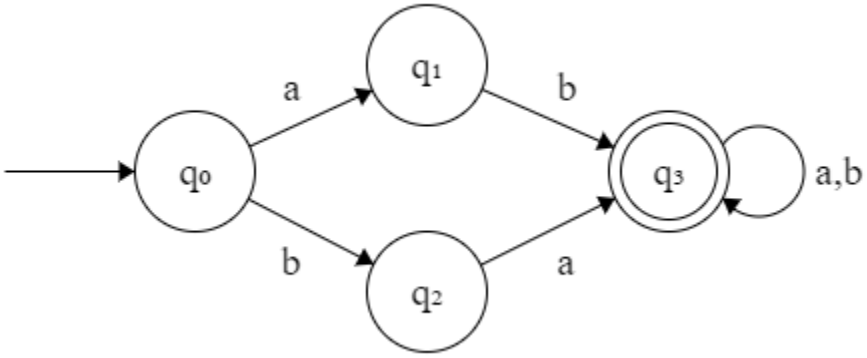
{w| w has an odd number of a′s}



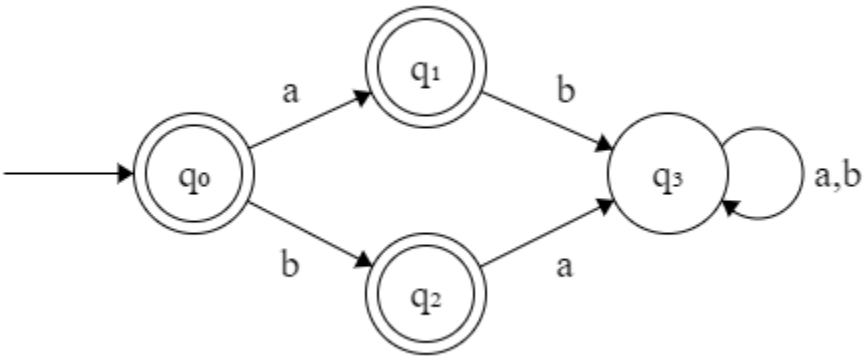
{w| w has an even length and an odd number of a′s}



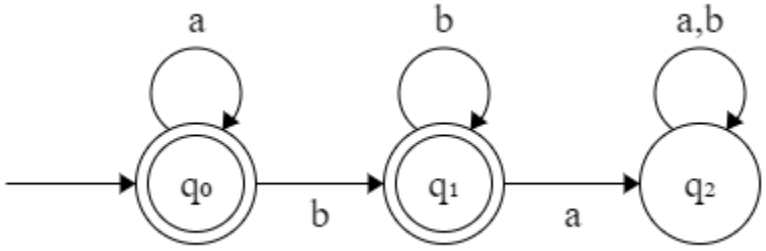
1.5 c. {w| w contains the substrings ab or ba}



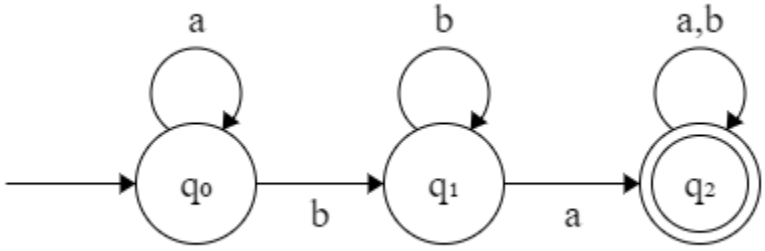
{w| w contains neither the substrings ab nor ba}



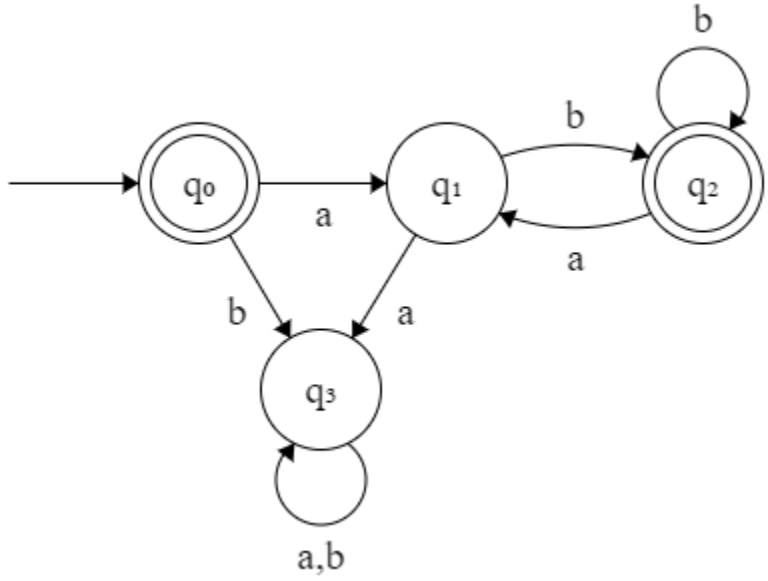
1.5 d. {w| w is any string in a^*b^*}



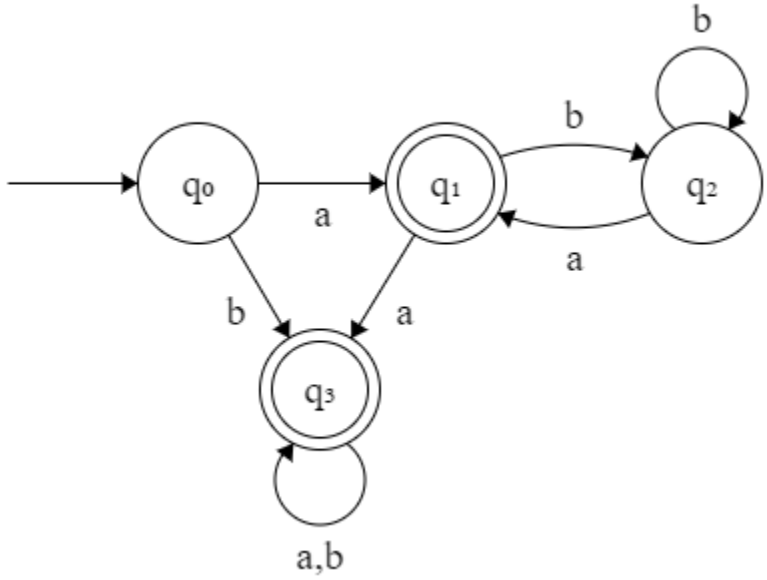
{w| w is any string not in a^*b^*}



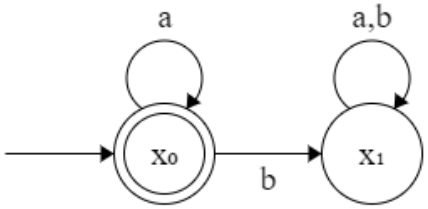
1.5 e. {w| w is any string in $(ab^+)^*$}

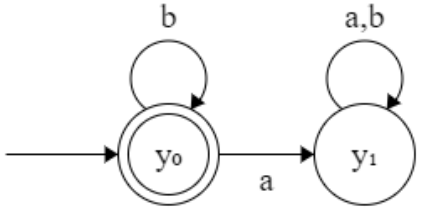


{w| w is any string not in $(ab^+)^*$}

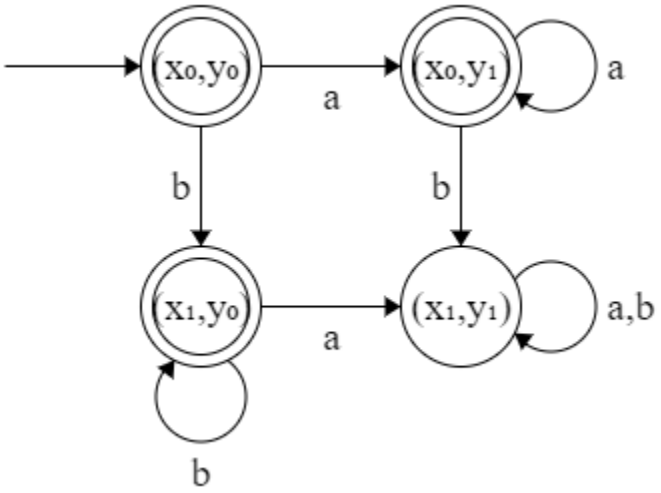


1.5 f. {w| w is any string in a^*} {w| w is any string in b^*}

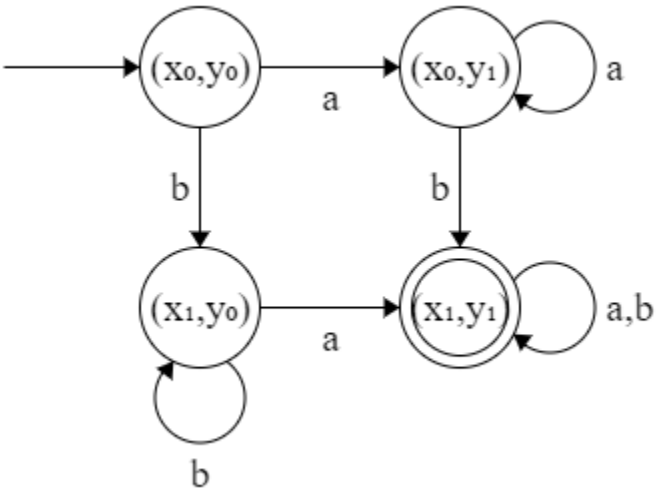




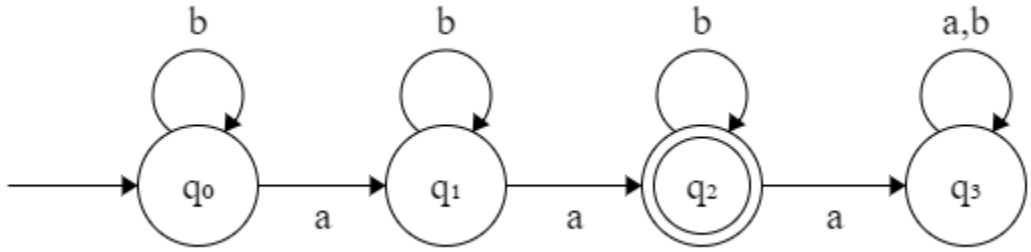
{w| w is any string in $a^* \cup b^*$}



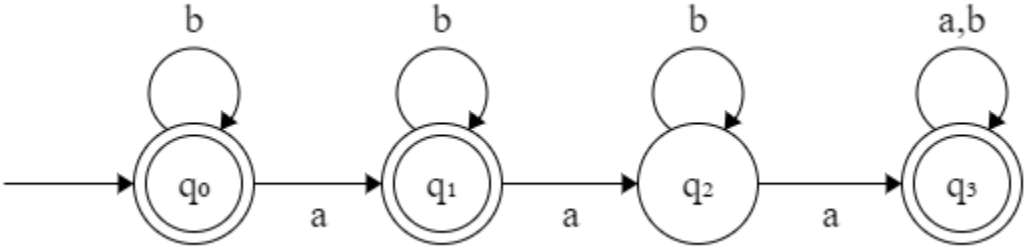
{w| w is any string not in $a^* \cup b^*$}



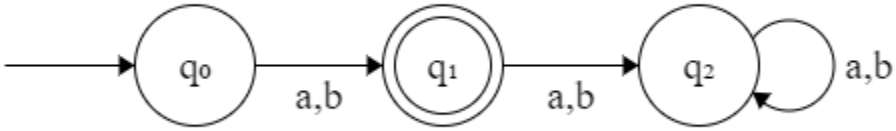
1.5 g. {w| w is any string that contains exactly two a′s}



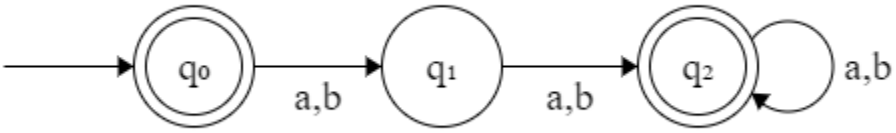
{w| w is any string that doesn′tcontain exactly two a′s}



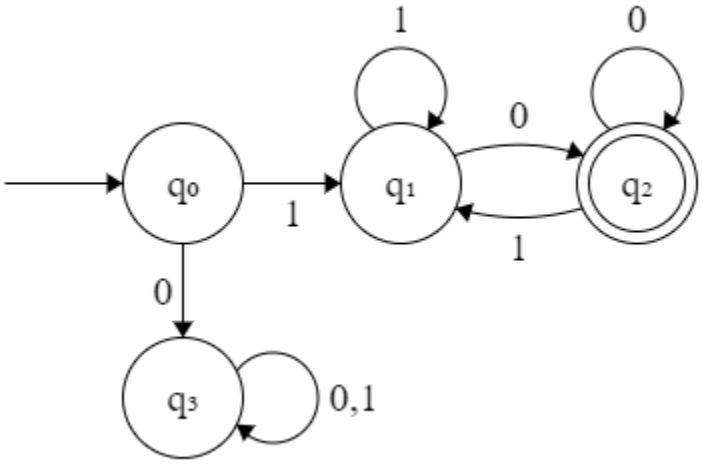
1.5 h. {w| w is a or b}



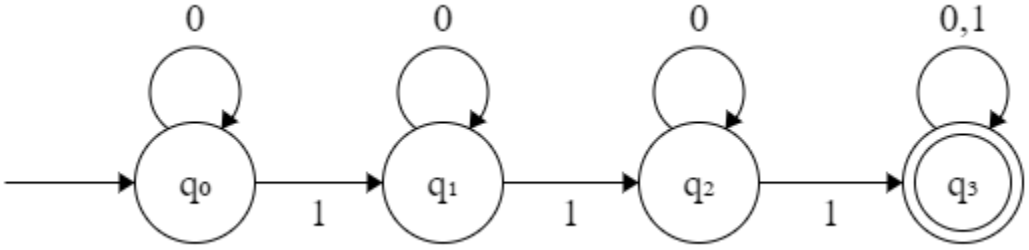
{w| w is any string except a and b}



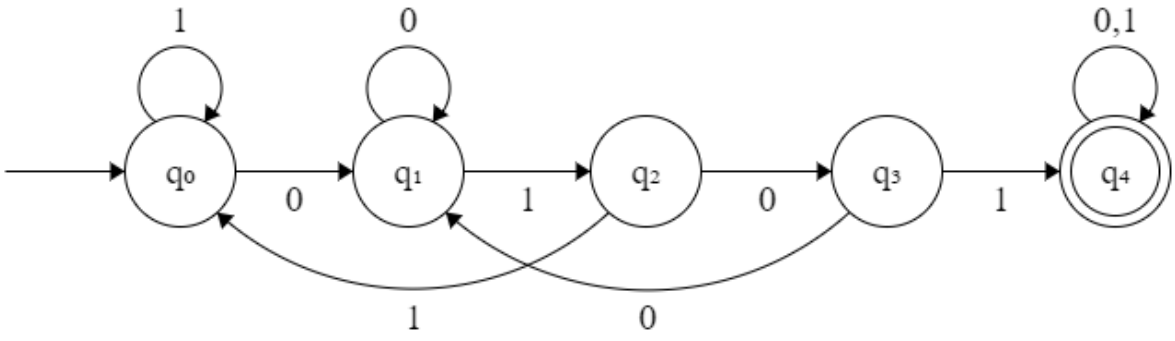
1.6 a. {w| w begins with a 1 and ends with a 0}



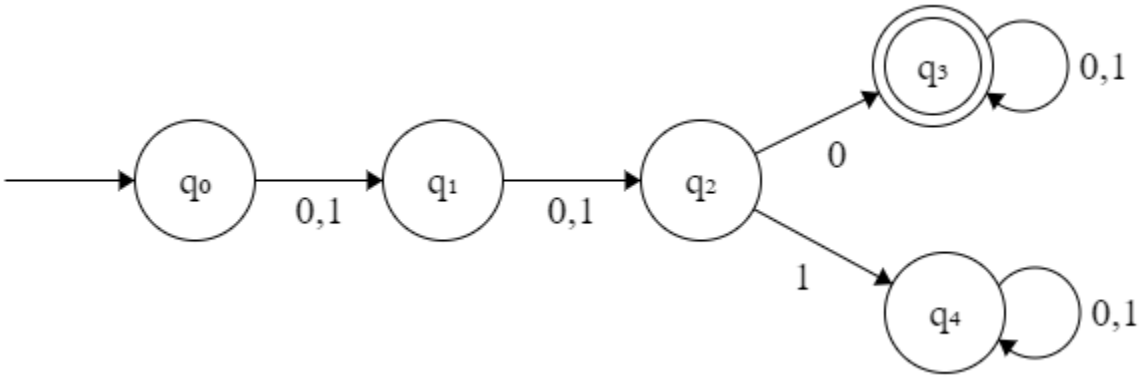
1.6 b. {w| w contains at least three 1s}



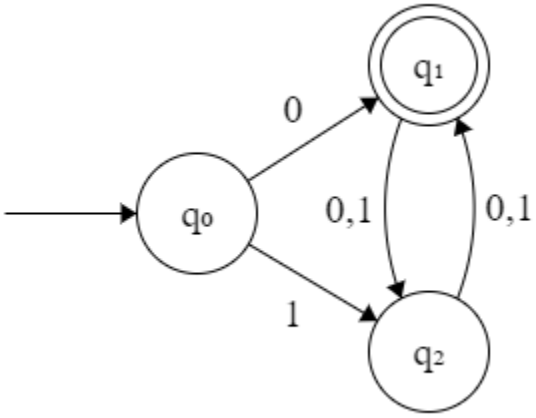
1.6 c. {w| w contains the substring 0101}



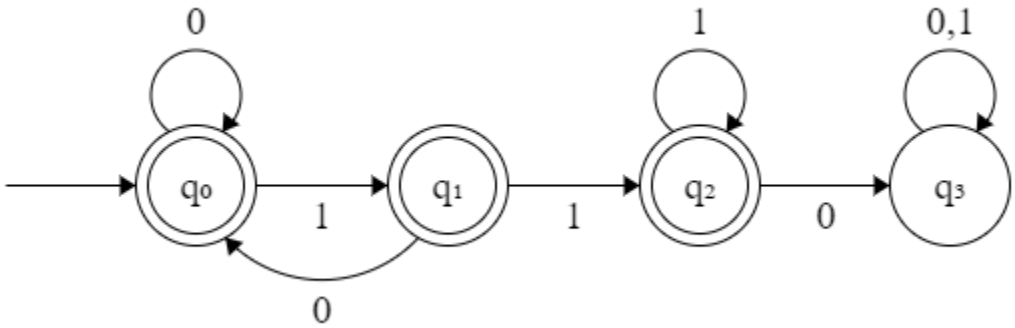
1.6 d. {w| w has length at least 3 and its third symbol is a 0



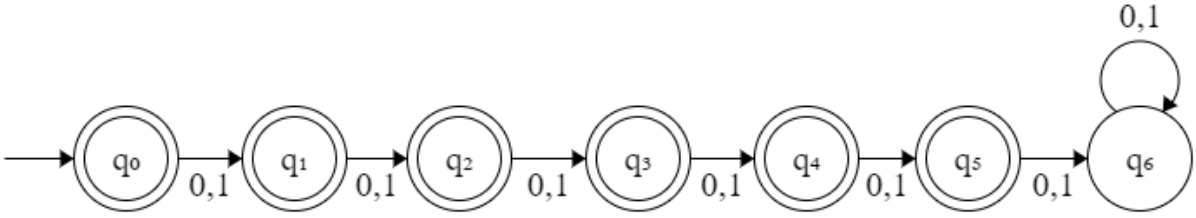
1.6 e. {w| w starts with 0 and has odd length, or starts with 1 and has even length}



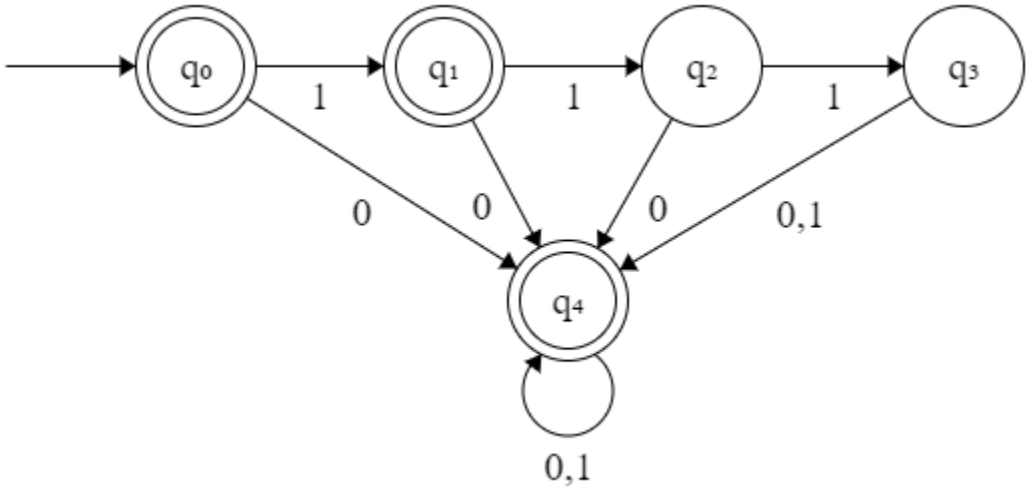
1.6 f. {w| w doesn't contain the substring 110}



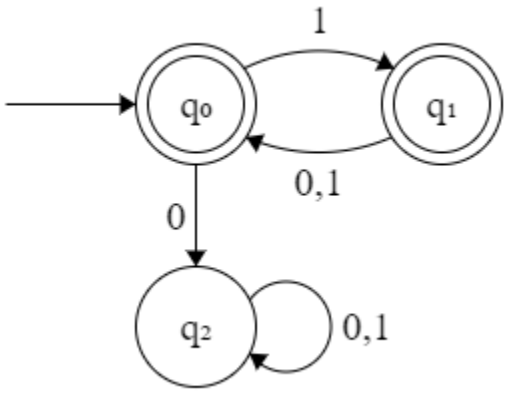
1.6 g. {w| the length of w is at most 5}



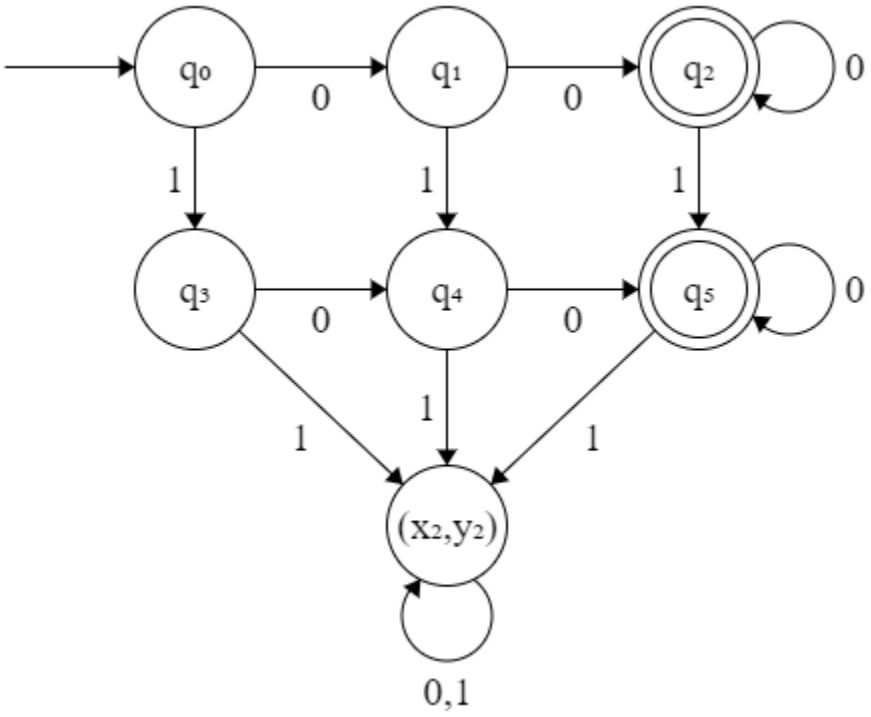
1.6 h. {w| w is any string except 11 and 111}



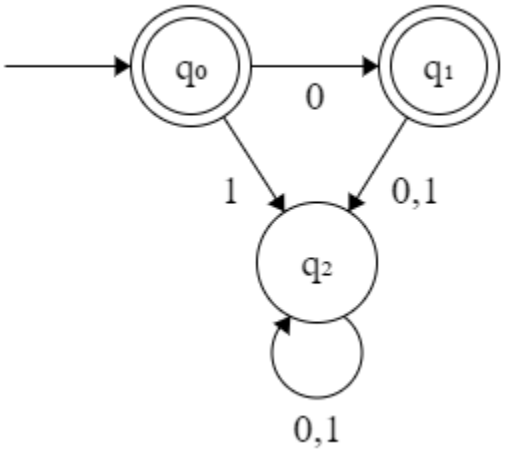
1.6 i. {w| every odd position of w is a 1}



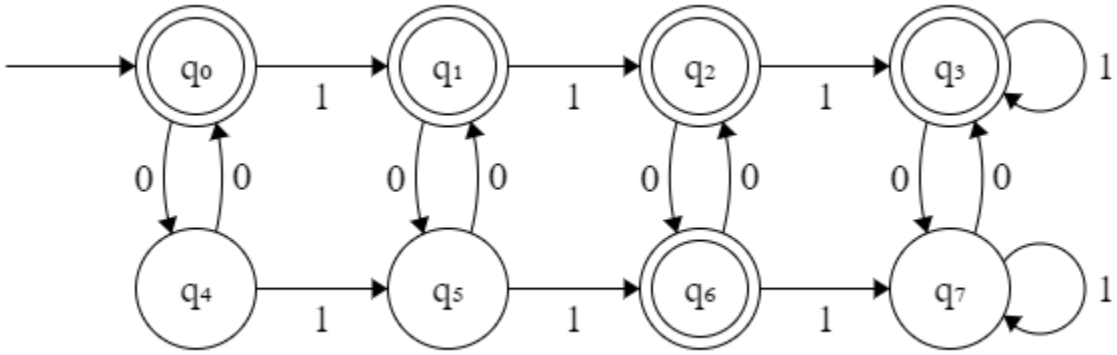
1.6 j. {w| w contains at least two 0s and at most one 1}



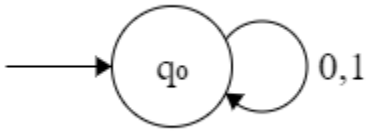
1.6 k. {ε, 0}



1.6 l. {w| w contains an even number of 0s, or contains exactly two 1s}



1.6 m. The empty set



1.6 n. All strings except the empty string