Introduction to the Theory of Computation
Chapter 1 Exercises

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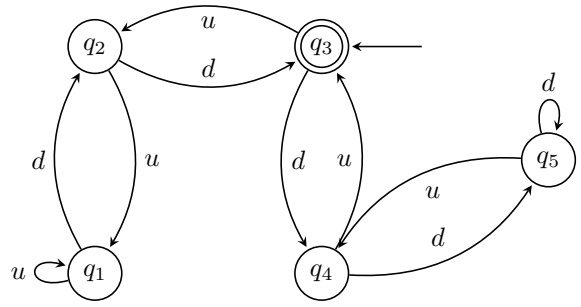
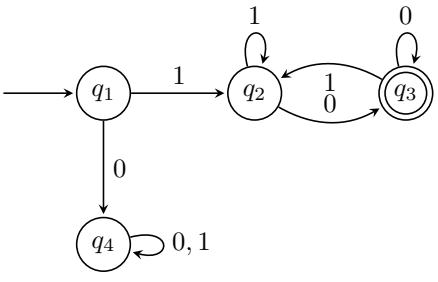
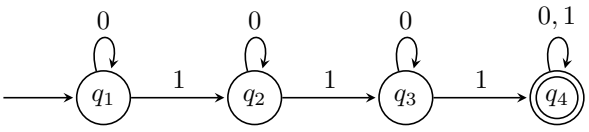
1. (a) q_1
   (b) $\{q_2\}$
   (c) q_1
   (d) $\{q_1, q_4\}$
   (e) q_1, q_2, q_3, q_1, q_1
   (f) No
   (g) Yes

2. $M_1 = (\{q_1, q_2, q_3\}, \{a, b\}, \delta, q_1, \{q_2\})$
   where $\delta(q_1, a) = q_2, \delta(q_1, b) = q_1, \delta(q_2, \text{.}) = q_3, \delta(q_3, a) = q_2, \delta(q_3, b) = q_1$
   $M_2 = (\{q_1, q_2, q_3, q_4\}, \{a, b\}, \delta, q_1, \{q_1, q_4\})$
   where $\delta(q_1, a) = q_q, \delta(q_1, b) = q_2, \delta(q_2, a) = q_3, \delta(q_2, b) = q_4, \delta(q_3, a) = q_2, \delta(q_3, b) = q_1, \delta(q_4, a) = q_3, \delta(q_4, b) = q_4$

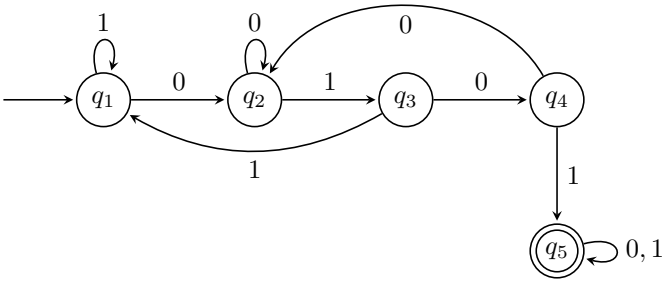
3. 

4. (a) 

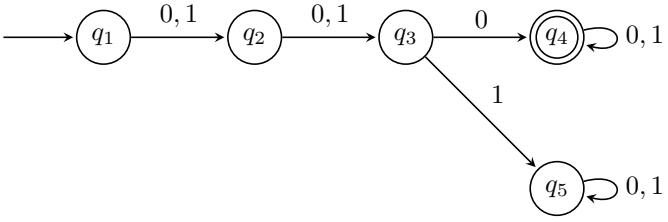
(b)


0
0
0
0, 1
1
1
1
q_1
q_2
q_3
q_4

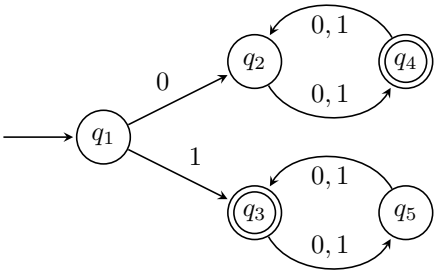
(c)


1
0
0
0
1
0
1
1
q_1
q_2
q_3
q_4
q_5
0, 1

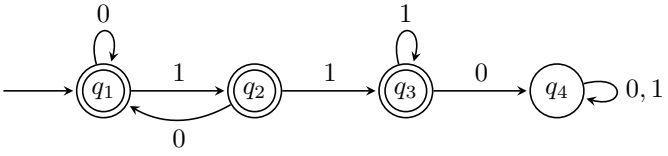
(d)


0, 1
0, 1
0
0, 1
1
q_1
q_2
q_3
q_4
q_5
0, 1

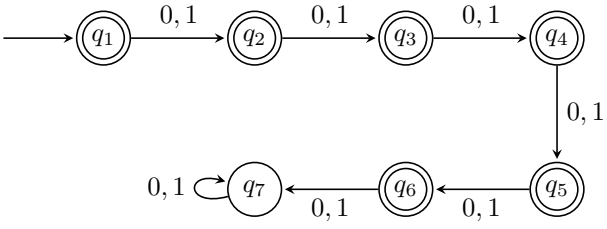
(e)


0, 1
0
0, 1
1
0, 1
0, 1
q_1
q_2
q_3
q_4
q_5

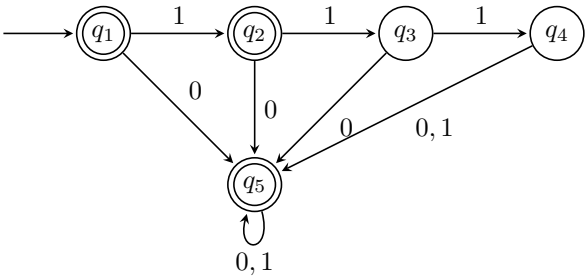
(f)


0
1
1
1
0
0, 1
0
q_1
q_2
q_3
q_4

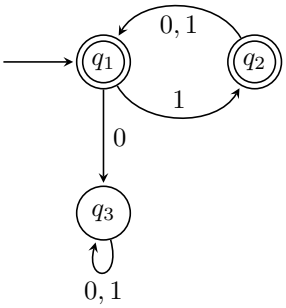
(g)


0, 1
0, 1
0, 1
0, 1
0, 1
0, 1
0, 1
0, 1
q_1
q_2
q_3
q_4
q_5
q_6
q_7

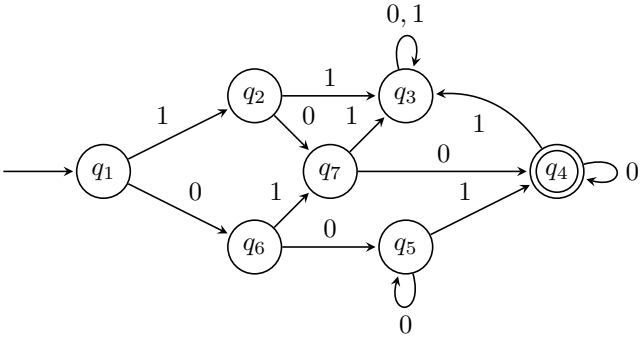
(h)


q_1
q_2
q_3
q_4
q_5
1
1
1
0
0
0
0, 1
0, 1

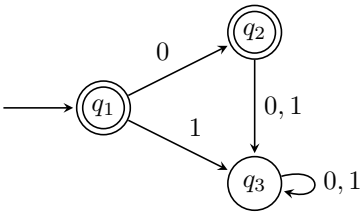
(i)


q_1
q_2
q_3
0, 1
1
0
0, 1

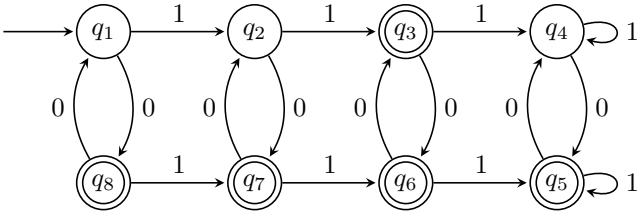
(j)


q_1
q_2
q_3
q_4
q_5
q_6
q_7
0, 1
1
0
1
1
0
0
1
1
0
0

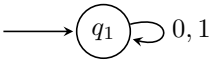
(k)


q_1
q_2
q_3
0
1
0, 1
0, 1

(l)


q_1
q_2
q_3
q_4
q_5
q_6
q_7
q_8
1
1
1
1
1
1
1
0
0
0
0
0
0
0
0
1
1

(m)



(n)