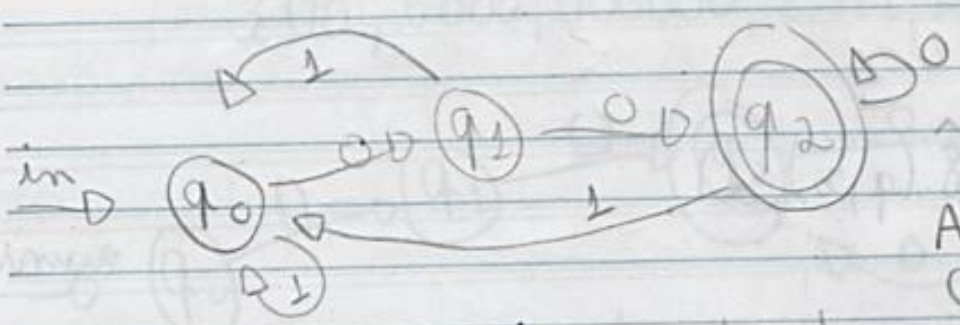
e2.1 $\Sigma = \{0, 1\}$

a) $L = \{ w \mid w \text{ termina em } 00 \}$



$A = \{Q, \Sigma, \delta, q_0, F\}$

$Q = \{q_0, q_1, q_2\}$

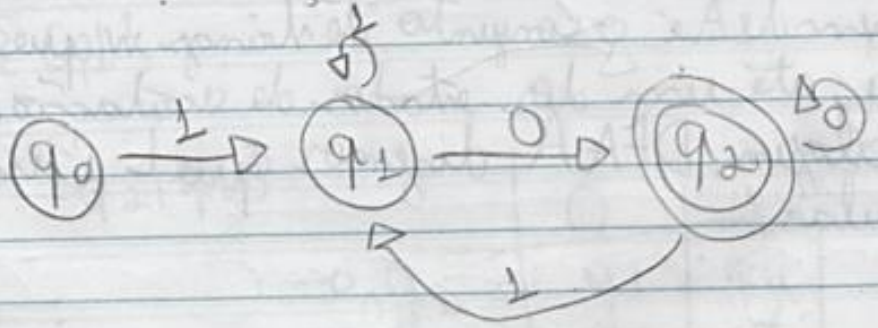
$\Sigma = \{0, 1\}$

$F = \{q_2\}$

δ :

	0	1
$\rightarrow q_0$	q_1	q_0
q_1	q_2	q_0
$*q_2$	q_2	q_0

b) $L = \{ w \mid w \text{ começa com } 1 \text{ e termina com } 0 \}$



$A = \{Q, \Sigma, \delta, q_0, F\}$

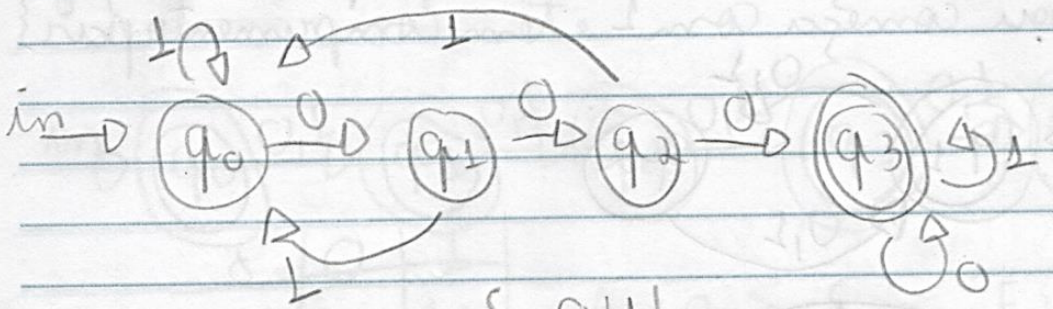
$Q = \{q_0, q_1, q_2\}$

$\Sigma = \{0, 1\}$

$F = \{q_2\}$

δ	0	1
$\rightarrow q_0$	$\emptyset$	q_1
q_1	q_2	q_1
$*q_2$	q_2	q_1

c) $L = \{w \mid w$ possui três 0's consecutivos$\}$



$A = \{Q, \Sigma, \delta, q_0, F\}$

$Q = \{q_0, q_1, q_2, q_3\}$

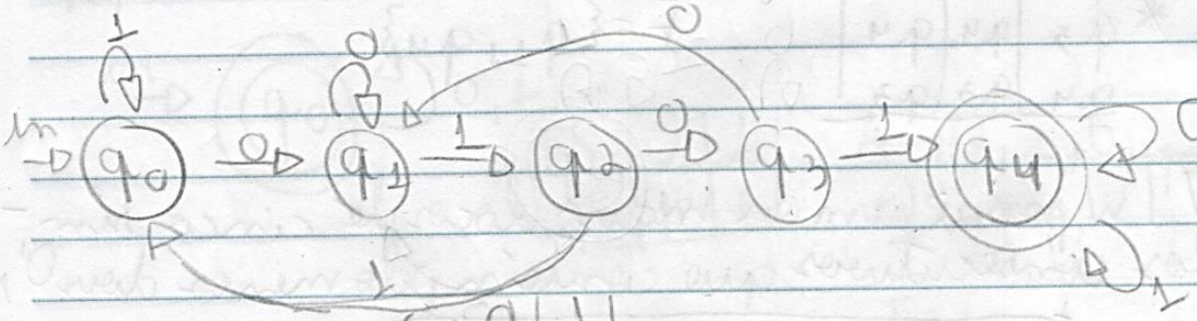
$\Sigma = \{0, 1\}$

$F = \{q_3\}$

δ	0	1
$\rightarrow q_0$	q_1	q_0
q_1	q_2	q_0
q_2	q_3	q_0
$*q_3$	q_3	q_3

d) $L = \{w \mid w$ contém a subcadeia $0101\}$

$w = x0101y$



δ	0	1
$\rightarrow q_0$	q_1	q_0
q_1	q_1	q_2
q_2	q_3	q_0
q_3	q_1	q_4
$*q_4$	q_4	q_4

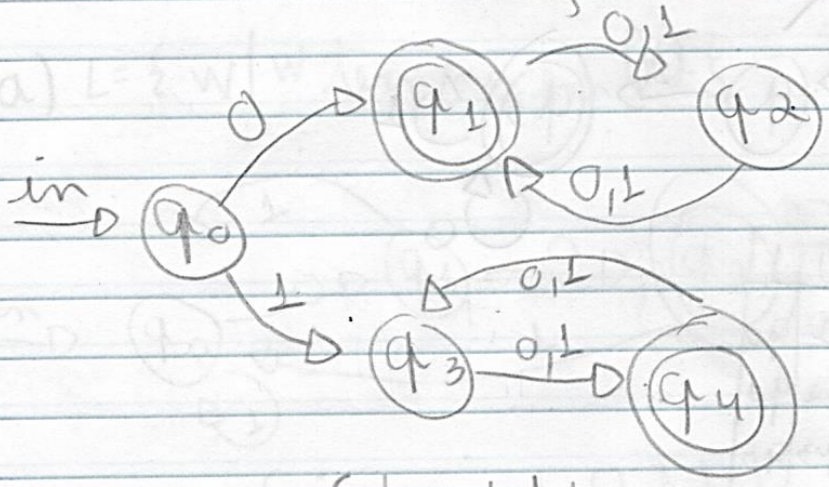
$A = \{Q, \Sigma, \delta, q_0, F\}$

$Q = \{q_0, q_1, q_2, q_3, q_4\}$

$\Sigma = \{0, 1\}$

$F = \{q_4\}$

e) $L = \{w \mid w$ começa com 0 e tem comprimento ímpar, ou começa com 1 e tem comprimento par$\}$



δ	0	1
→ q_0	q_1	q_3
* q_1	q_2	q_2
q_2	q_1	q_1
* q_3	q_4	q_4
q_4	q_3	q_3

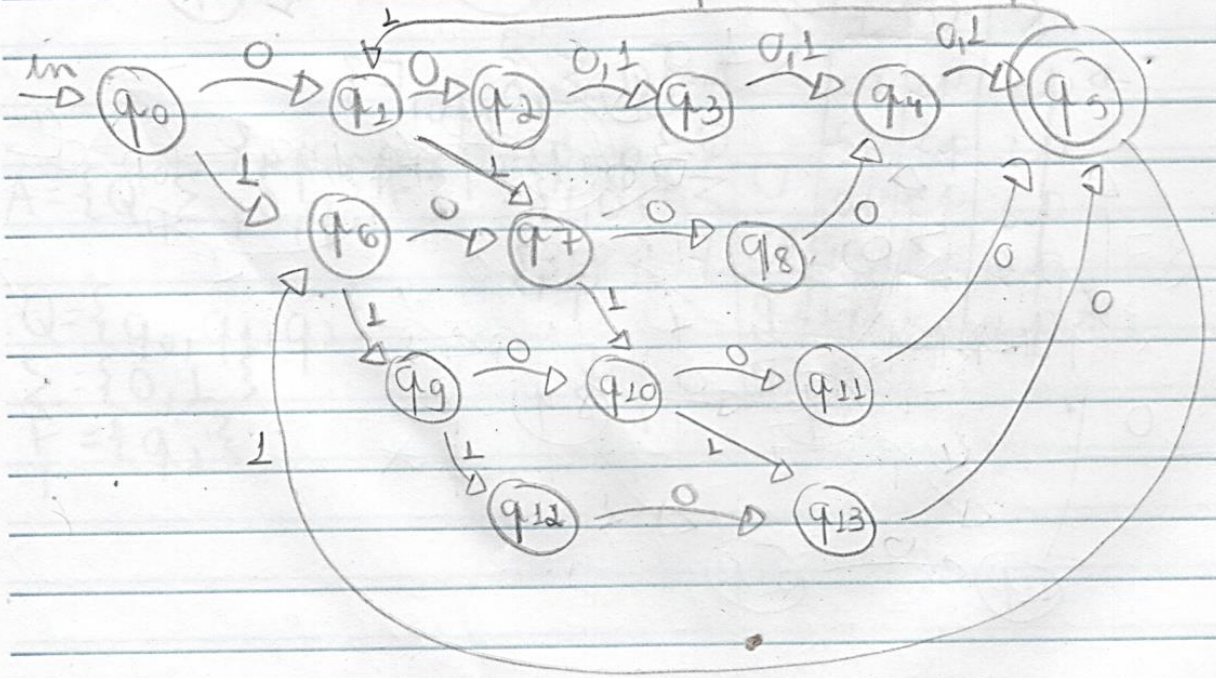
$A = \{Q, \Sigma, \delta, q_0, F\}$

$Q = \{q_0, q_1, q_2, q_3, q_4\}$

$\Sigma = \{0, 1\}$

$F = \{q_1, q_4\}$

f) $L = \{w \mid w$ possui um ou mais blocos de cinco símbolos consecutivos que contém pelo menos dois 0's$\}$



(2.1) p)

$A = \{Q, \Sigma, \delta, q_0, F\}$

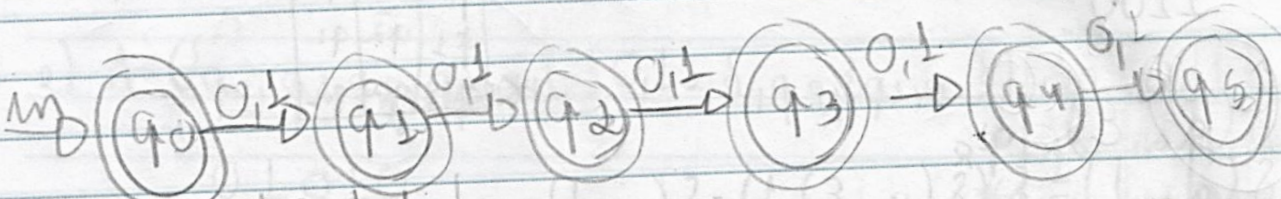
$Q = \{q_1, q_2, q_3, q_4, q_5, q_6, q_7, q_8, q_9, q_{10}, q_{11}, q_{12}, q_{13}\}$

$\Sigma = \{0, 1\}$

$F = \{q_5\}$

	δ	0	1
→	q_0	q_1	q_6
	q_1	q_2	q_7
	q_2	q_3	q_3
	q_3	q_4	q_4
	q_4	q_5	q_5
*	q_5	q_1	q_6
	q_6	q_7	q_9
	q_7	q_8	q_{10}
	q_8	q_4	q_5
	q_9	q_{10}	q_{12}
	q_{10}	q_{11}	q_{13}
	q_{11}	q_5	q_5
	q_{12}	q_{13}	q_5
	q_{13}	q_5	q_5

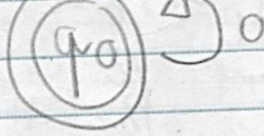
a) $L = \{w \mid \text{comprimento de } w \text{ é no max } 5\}$



δ	0	1
→ q_0	q_1	q_1
* q_1	q_2	q_2
* q_2	q_3	q_3
* q_3	q_4	q_4
* q_4	q_5	q_5
* q_5	$\emptyset$	$\emptyset$

$A = \{Q, \Sigma, \delta, q_0, F\}$
$Q = \{q_0, q_1, q_2, q_3, q_4, q_5\}$
$\Sigma = \{0, 1\}$
$F = \{q_5\}$

b) $L = \Sigma^*$



δ	0	1
→ * q_0	q_0	q_0

$A = \{Q, \Sigma, \delta, q_0, F\}$
$Q = \{q_0\}$
$\Sigma = \{0, 1\}$
$F = \{q_0\}$

e2.2) a) 1100

$A = (\{q_0, q_1, q_2\}, \{0,1\}, \delta, q_0, q_2)$

δ	0	1
→ q_0	q_1	q_0
q_1	q_2	q_0
* q_2	q_2	q_0

$\hat{\delta}(q_0, \varepsilon) = q_0$
$\hat{\delta}(q_0, 1) = \delta(\hat{\delta}(q_0, \varepsilon), 1) = \delta(q_0, 1) = q_0$
$\hat{\delta}(q_0, 11) = \delta(\hat{\delta}(q_0, 1), 1) = \delta(q_0, 1) = q_0$
$\hat{\delta}(q_0, 110) = \delta(\hat{\delta}(q_0, 11), 0) = \delta(q_0, 0) = q_1$
$\hat{\delta}(q_0, 1100) = \delta(\hat{\delta}(q_0, 110), 0) = \delta(q_1, 0) = q_2$

b) $A=(\{q_0,q_1,q_2\},\{0,1\},\delta,q_0,q_2)$

1100

δ	0	1
→ q_0	$\emptyset$	q_1
q_1	q_2	q_1
* q_2	q_2	q_2

$\hat{\delta}(q_0,\varepsilon)=q_0$

$\hat{\delta}(q_0,1)=\delta(\hat{\delta}(q_0,\varepsilon),1)=\delta(q_0,1)=q_1$

$\hat{\delta}(q_0,11)=\delta(\hat{\delta}(q_0,1),1)=\delta(q_1,1)=q_1$

$\hat{\delta}(q_0,110)=\delta(\hat{\delta}(q_0,11),0)=\delta(q_1,0)=q_2$

$\hat{\delta}(q_0,1100)=\delta(\hat{\delta}(q_0,110),0)=\delta(q_2,0)=q_2$

c) $A=(\{q_0,q_1,q_2,q_3\},\{0,1\},\delta,q_0,q_3)$

10001

δ	0	1
→ q_0	q_1	q_0
q_1	q_2	q_0
q_2	q_3	q_0
* q_3	q_3	q_3

$\hat{\delta}(q_0,\varepsilon)=q_0$

$\hat{\delta}(q_0,1)=\delta(\hat{\delta}(q_0,\varepsilon),1)=\delta(q_0,1)=q_0$

$\hat{\delta}(q_0,10)=\delta(\hat{\delta}(q_0,1),0)=\delta(q_0,0)=q_1$

$\hat{\delta}(q_0,100)=\delta(\hat{\delta}(q_0,10),0)=\delta(q_1,0)=q_2$

$\hat{\delta}(q_0,1000)=\delta(\hat{\delta}(q_0,100),0)=\delta(q_2,0)=q_3$

$\hat{\delta}(q_0,10001)=\delta(\hat{\delta}(q_0,1000),1)=\delta(q_3,1)=q_3$

d) $A=(\{q_0,q_1,q_2,q_3,q_4\},\{0,1\},\delta,q_0,q_4)$

11010100

δ	0	1
→ q_0	q_1	q_0
q_1	q_1	q_2
q_2	q_3	q_0
q_3	q_1	q_4
* q_4	q_4	q_4

$\hat{\delta}(q_0,\varepsilon)=q_0$

$\hat{\delta}(q_0,1)=\delta(\hat{\delta}(q_0,\varepsilon),1)=\delta(q_0,1)=q_0$

$\hat{\delta}(q_0,11)=\delta(\delta(q_0,1),1)=\delta(q_0,1)=q_0$

$\hat{\delta}(q_0,110)=\delta(\delta(q_0,11),0)=\delta(q_0,0)=q_1$

$\hat{\delta}(q_0,1101)=\delta(\hat{\delta}(q_0,110),1)=\delta(q_1,1)=q_2$

$\hat{\delta}(q_0,11010)=\delta(\hat{\delta}(q_0,1101),0)=\delta(q_2,0)=q_3$

$\hat{\delta}(q_0,110101)=\delta(\hat{\delta}(q_0,11010),1)=\delta(q_3,1)=q_4$

$\hat{\delta}(q_0,1101010)=\delta(\hat{\delta}(q_0,110101),0)=\delta(q_4,0)=q_4$

$\hat{\delta}(q_0, 11010100) = \delta(\hat{\delta}(q_0, 1101010), 0) = \delta(q_4, 0) = q_4$

e) $A = (\{q_0, q_1, q_2, q_3, q_4\}, \{0,1\}, \delta, q_0, \{q_1, q_4\})$

01010

δ	0	1
→ q_0	q_1	q_3
* q_1	q_2	q_2
q_2	q_1	q_1
q_3	q_4	q_4
* q_4	q_3	q_3

$\hat{\delta}(q_0, \varepsilon) = q_0$
$\hat{\delta}(q_0, 0) = \delta(\hat{\delta}(q_0, \varepsilon), 0) = \delta(q_0, 0) = q_1$
$\hat{\delta}(q_0, 01) = \delta(\hat{\delta}(q_0, 0), 1) = \delta(q_1, 1) = q_2$
$\hat{\delta}(q_0, 010) = \delta(\hat{\delta}(q_0, 01), 0) = \delta(q_2, 0) = q_1$
$\hat{\delta}(q_0, 0101) = \delta(\hat{\delta}(q_0, 010), 1) = \delta(q_1, 1) = q_2$

f) $A = (\{q_0, q_1, q_2\}, \{0,1\}, \delta, q_0, q_2)$

11001

$\hat{\delta}(q_0, \varepsilon) = q_0$
$\hat{\delta}(q_0, 1) = \delta(\hat{\delta}(q_0, \varepsilon), 1) = \delta(q_0, 1) = q_0$
$\hat{\delta}(q_0, 11) = \delta(\hat{\delta}(q_0, 1), 1) = \delta(q_0, 1) = q_0$
$\hat{\delta}(q_0, 110) = \delta(\hat{\delta}(q_0, 11), 0) = \delta(q_0, 0) = q_1$
$\hat{\delta}(q_0, 1100) = \delta(\hat{\delta}(q_0, 110), 0) = \delta(q_1, 0) = q_2$
$\hat{\delta}(q_0, 11001) = \delta(\hat{\delta}(q_0, 1100), 1) = \delta(q_2, 1) = q_0$

g) $A = (\{q_0, q_1, q_2, q_3, q_4, q_5\}, \{0,1\}, \delta, q_0, \{q_2, q_3, q_4, q_5\})$

001

δ	0	1
* → q_0	q_1	q_1
* q_1	q_2	q_2
* q_2	q_3	q_3
* q_3	q_4	q_4
* q_4	q_5	q_5
* q_5	$\emptyset$	$\emptyset$

$\hat{\delta}(q_0, \varepsilon) = q_0$
$\hat{\delta}(q_0, 0) = \delta(\hat{\delta}(q_0, \varepsilon), 0) = \delta(q_0, 0) = q_1$
$\hat{\delta}(q_0, 00) = \delta(\hat{\delta}(q_0, 0), 0) = \delta(q_1, 0) = q_2$
$\hat{\delta}(q_0, 001) = \delta(\hat{\delta}(q_0, 00), 1) = \delta(q_2, 1) = q_3$

R) $A=(q_0, \{0,1\}, \delta, q_0, q_0)$

δ	0	1
q_0	q_0	q_0

$1\,0\,1\,0\,1$

$\hat{\delta}(q_0, \varepsilon) = q_0$

$\hat{\delta}(q_0, 1) = \delta(\hat{\delta}(q_0, \varepsilon), 1) = \delta(q_0, 1) = q_0$

$\hat{\delta}(q_0, 10) = \delta(\hat{\delta}(q_0, 1), 0) = \delta(q_0, 0) = q_0$

$\hat{\delta}(q_0, 101) = \delta(\hat{\delta}(q_0, 10), 1) = \delta(q_0, 1) = q_0$

$\hat{\delta}(q_0, 1010) = \delta(\hat{\delta}(q_0, 101), 0) = \delta(q_0, 0) = q_0$

$\hat{\delta}(q_0, 10101) = \delta(\hat{\delta}(q_0, 1010), 1) = \delta(q_0, 1) = q_0$