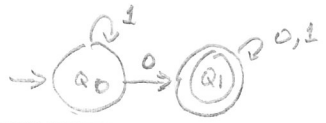
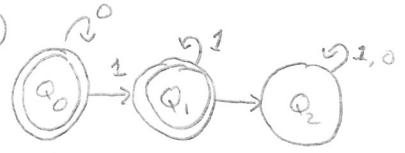
Part 1 $\Sigma = \{0,1\}$

1.



good	bad
01	ε
110	11
111010	111

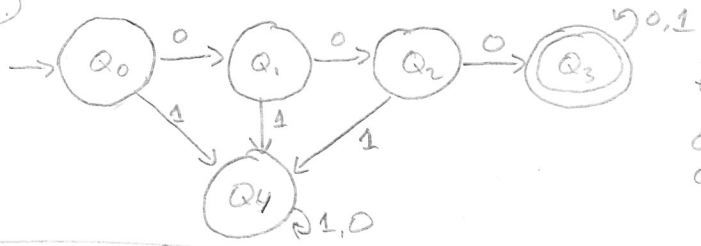
2.



good	bad
000	0010
011	10
ε	110

a.) A language that once the first "1" is reached, all following characters must be "1".

3.



good	bad
000	ε
0001	010
00010	1000

a.) $\delta = \{(Q_0,0)\to Q_2, (Q_0,1)\to Q_4, (Q_1,0)\to Q_2, (Q_1,1)\to Q_4, (Q_2,0)\to Q_3, (Q_2,1)\to Q_4, (Q_3,0)\to Q_3, (Q_3,1)\to Q_3, (Q_4,0)\to Q_4, (Q_4,1)\to Q_4\}$

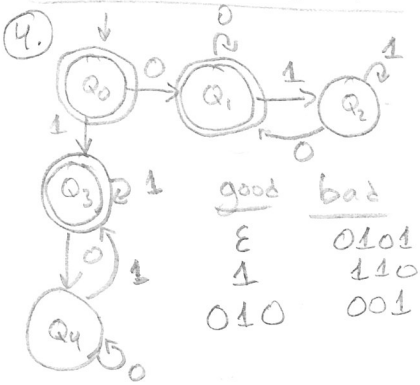
$\Sigma = \{0,1\}$

$Q = \{Q_0, Q_1, Q_2, Q_3, Q_4\}$

$S = \{Q_0\}$

$F = \{Q_4\}$

4.



good	bad
ε	0101
1	110
010	001

$Q = \{Q_0, Q_1, Q_2, Q_3, Q_4\}$

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

$\delta = \{(Q_0,0)\to Q_1, (Q_0,1)\to Q_3, (Q_1,0)\to Q_1, (Q_1,1)\to Q_2, (Q_2,0)\to Q_1, (Q_2,1)\to Q_2, (Q_3,0)\to Q_4, (Q_3,1)\to Q_3, (Q_4,0)\to Q_4, (Q_4,1)\to Q_3\}$

$S = \{Q_0\}$

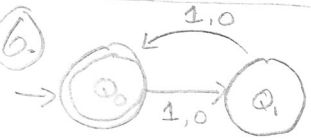
$F = \{Q_0, Q_1, Q_3\}$

5.

good	bad
111	ε
010	0
000	01

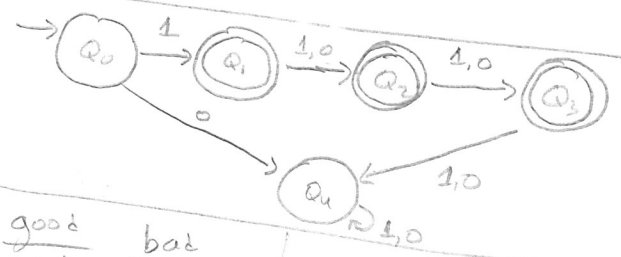
a) String that can be any characters but must be atleast 3 characters long.

6.



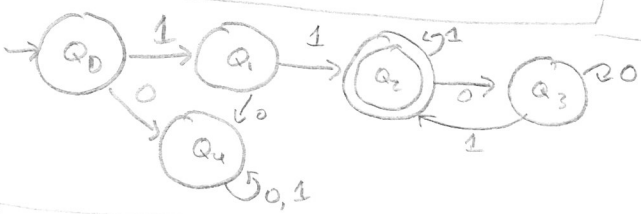
good	bad
ε	1
1011	100
11	01010

7.



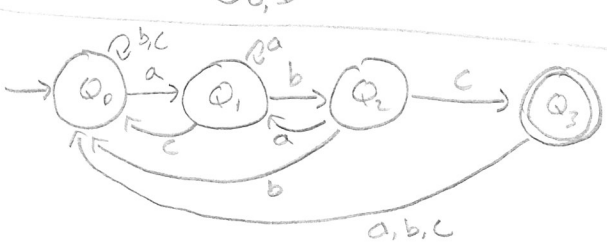
good	bad
101	ε
11	1100
1	01

8.



good	bad
11	ε
1101	1110
111	10

9.



$Q = \{Q_0, Q_1, Q_2, Q_3\}$

$\Sigma = \{a,b,c\}$

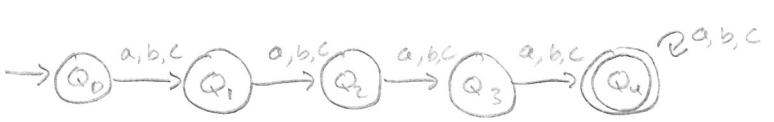
$S = \{Q_0\}$

$F = \{Q_3\}$

good	bad
abc	ε
ababc	abb
abbaabc	abcaa

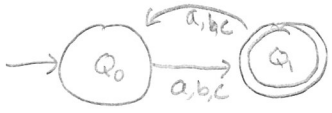
$\delta = \{(Q_0,a)\to Q_1, (Q_0,b)\to Q_0, (Q_0,c)\to Q_0, (Q_1,a)\to Q_1, (Q_1,b)\to Q_2, (Q_1,c)\to Q_0, (Q_2,a)\to Q_1, (Q_2,b)\to Q_0, (Q_2,c)\to Q_4, (Q_3,a)\to Q_0, (Q_3,b)\to Q_0, (Q_3,c)\to Q_0\}$

10.



good	bad
abca	ε
bbbb	ab
accb	abcca

11.

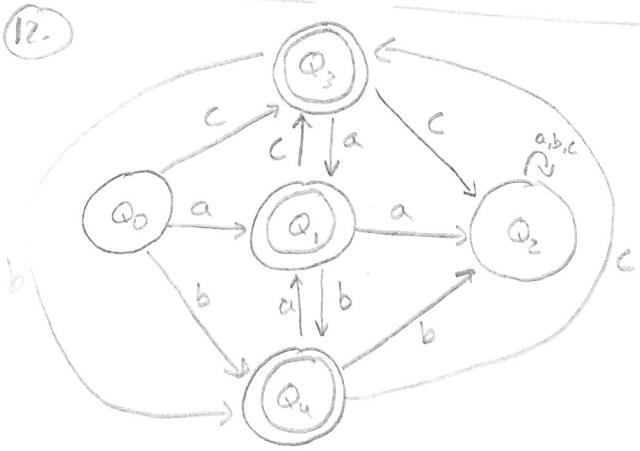


$Q = \{q_0, q_1\}$
$\Sigma = \{a, b, c\}$
$S = \{q_0\}$
$F = \{q_1\}$

$\delta = \{(q_0, a) \to q_1, (q_0, b) \to q_1, (q_0, c) \to q_1,$
$(q_1, a) \to q_0, (q_1, b) \to q_0, (q_1, c) \to q_0\}$

good	bad
abb	ε
abcab	ab
c	abbc

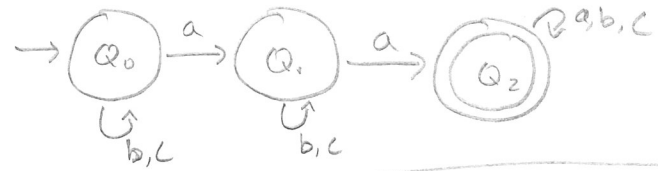
12.



$Q = \{q_0, q_1, q_2, q_3, q_4\}$
$\Sigma = \{a, b, c\}$
$\delta = \{(q_0, a) \to q_1, (q_0, b) \to q_4, (q_0, c) \to q_3,$
$(q_1, a) \to q_2, (q_1, b) \to q_4, (q_1, c) \to q_3,$
$(q_2, a) \to q_2, (q_2, b) \to q_2, (q_2, c) \to q_2,$
$(q_3, a) \to q_1, (q_3, b) \to q_4, (q_3, c) \to q_2,$
$(q_4, a) \to q_1, (q_4, b) \to q_2, (q_4, c) \to q_3\}$
$S = \{q_1\}$ $F = \{q_2, q_1, q_4\}$

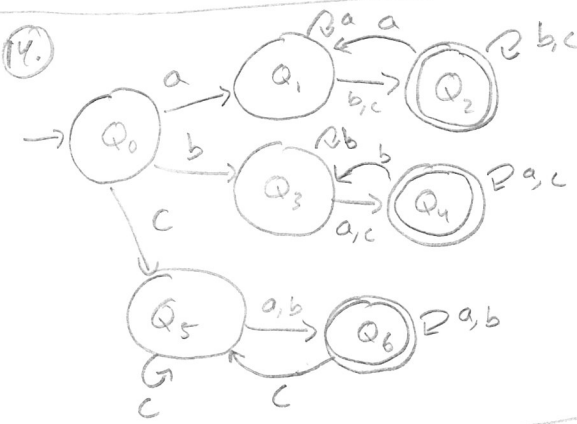
good	bad
abc	ε
bc	aa
c	bccb

13.



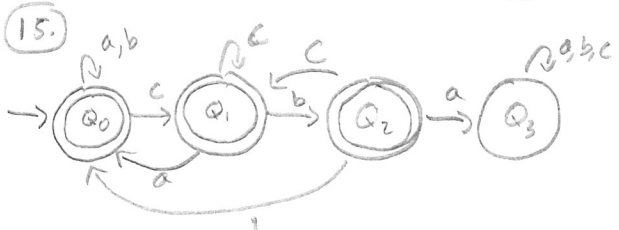
good	bad
baa	ε
baca	b
aa	abc

14.



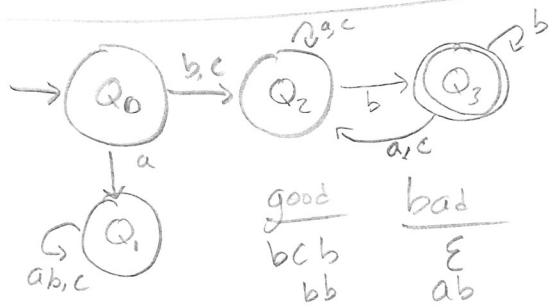
good	bad
ab	ε
babc	a
abcac	aaba

15.



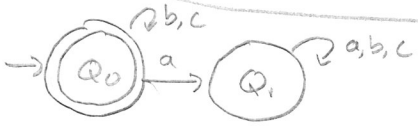
good	bad
abc	cba
bc	cbaa
ε	abcba

16.



good	bad
bcb	ε
bb	ab
cabab	cb

17.



good	bad
ε	bcba
bccb	a
c	aaab

Extra Credit

$\Sigma = \{1, 2, a, b\}$ - a language that only accepts a string if it contains only "a"s and "b"s or only "1"s and "2"s