Matemáticas Discretas

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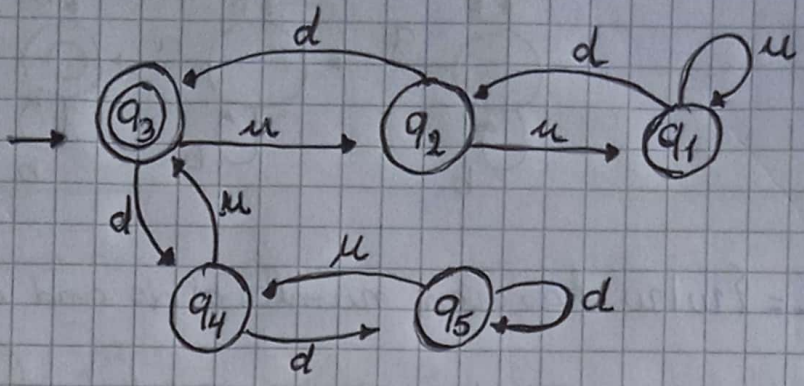
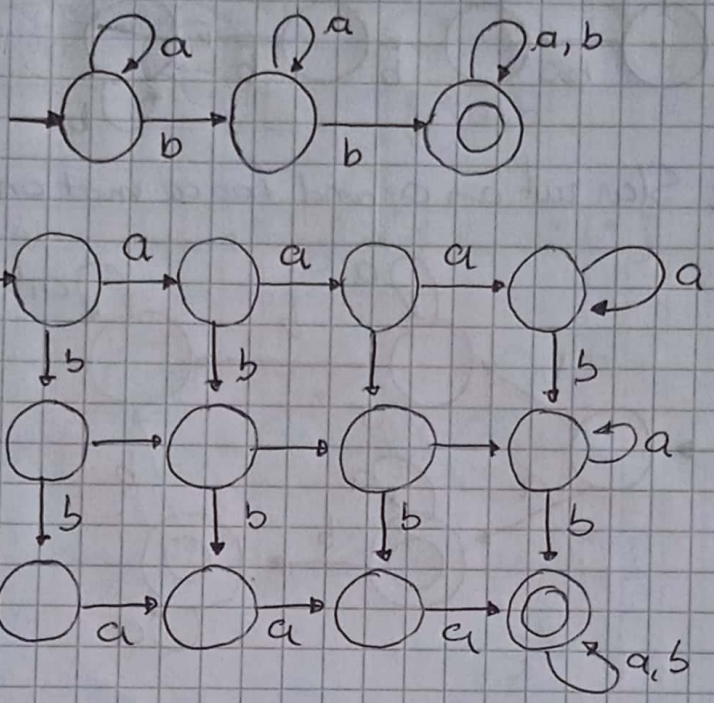
1.3. The formal description of a DEA is $(\{q_1, q_2, q_3, q_4, q_5\}, \{u, d\}, \delta, q_3, \{q_3\})$,

	u	d
q_1	q_1	q_2
q_2	q_1	q_3
q_3	q_2	q_4
q_4	q_3	q_5
q_5	q_4	q_5

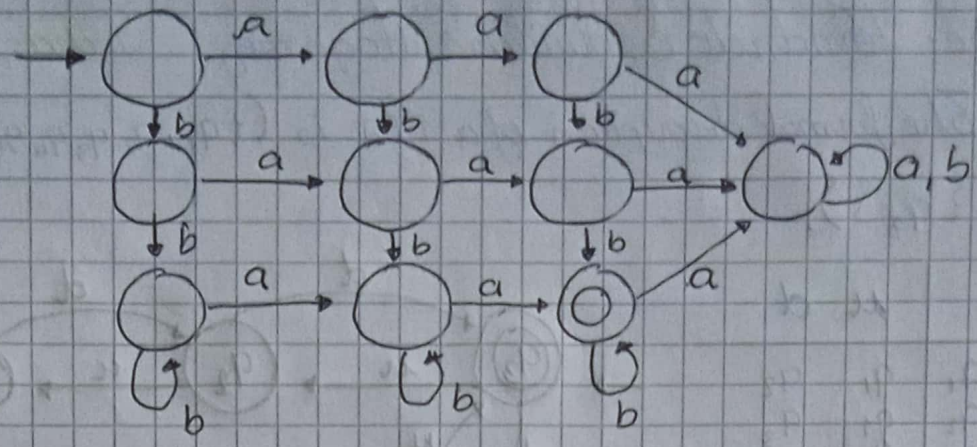


1.4 Intersection

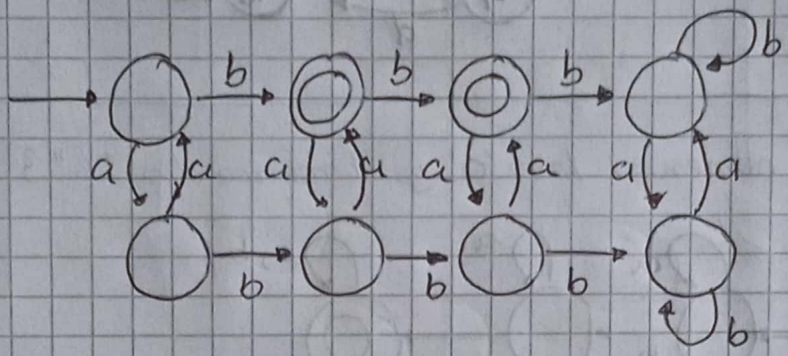
a) $\{w \mid w$ tiene almenos tres 'a' y almenos dos "b" $\}$



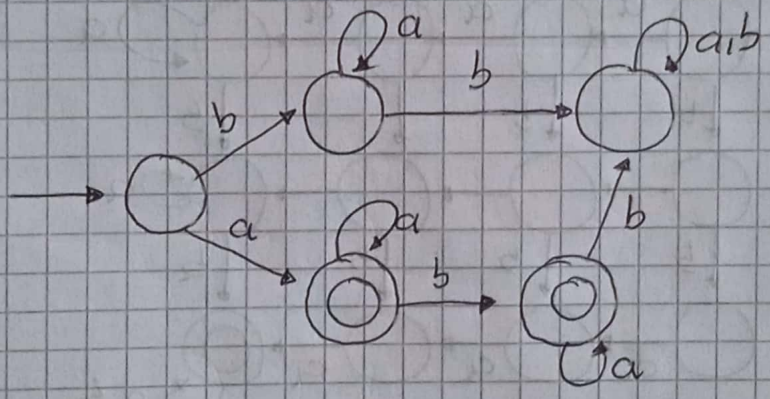
b) $L = \{w \mid w$ tenga exactamente 2 a y al menos 2 b $\}$



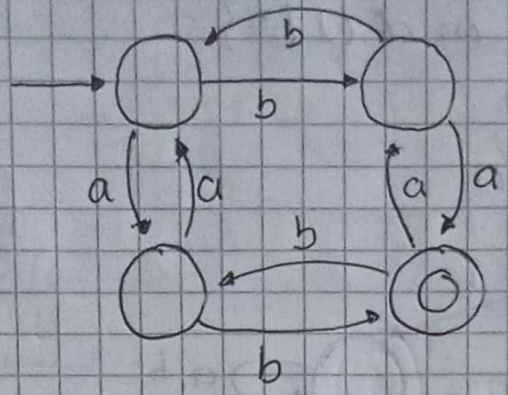
c) $L = \{w \mid w$ has even number of a's and one two b's $\}$



e) $L = \{w \mid w$ Start wit an a and has at most one b$\}$

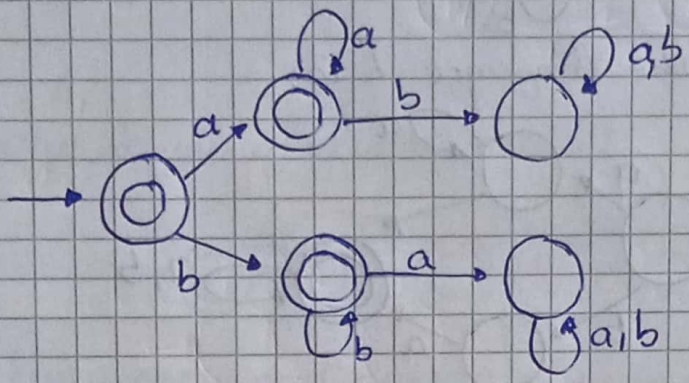


g) $L = \{w \mid w$ has even lengh and an odd number of a $\}$

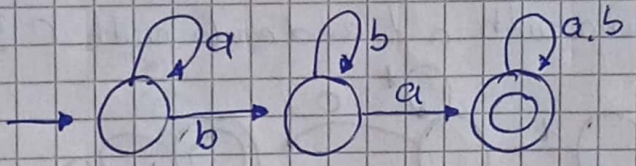


1,5

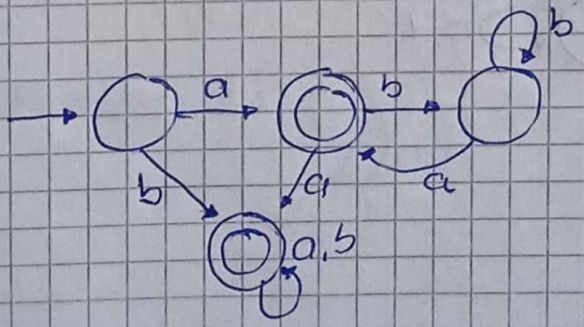
c) $\bar{L} = \{w \mid w$ contains neither the substrings ab or ba $\}$



d) $\bar{L} = \{w \mid w$ is any string not in $a^* b^* \}$



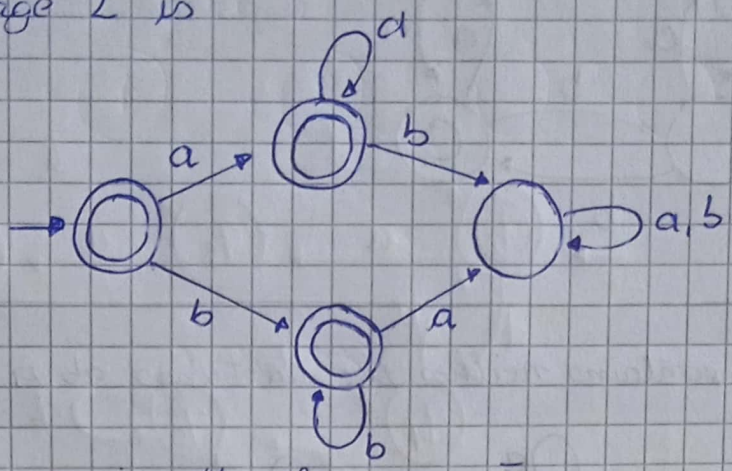
e) $\bar{L} = \{w \mid w$ is any string not in $(ab^*)^* \}$



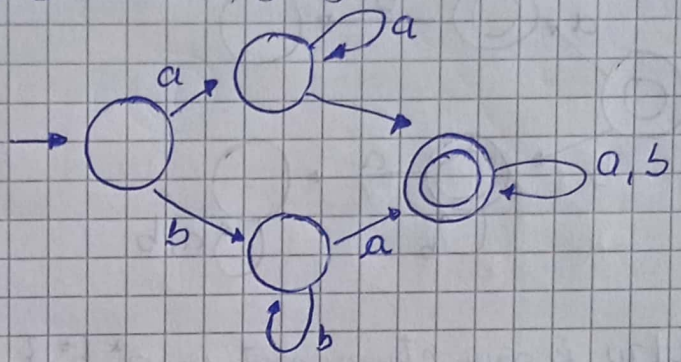
f) $\bar{L} = \{w \mid w$ is any string not in $a^* \cup b^*\}$

$L = \{w \mid w$ is any string in $a^* \cup b^*\}$

The language L is

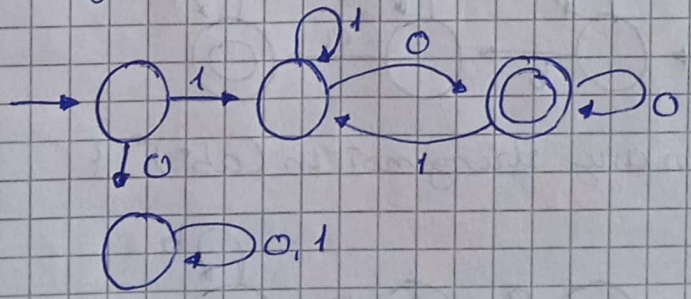


PEA the reconyges the lenguage $\bar{L}$ is:

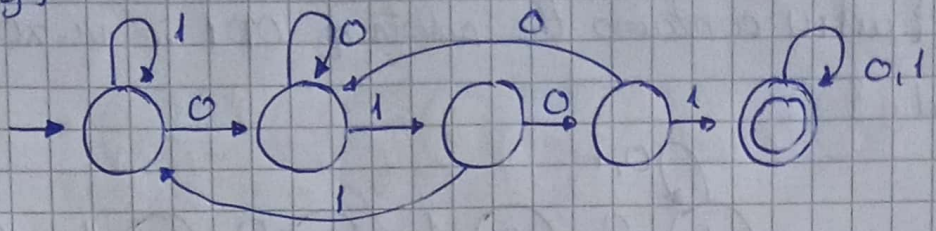


1,6

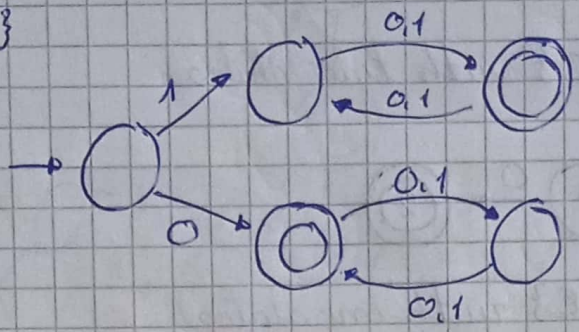
a) $L = \{w \mid w$ begins with a 1 and ends with 0 $\}$



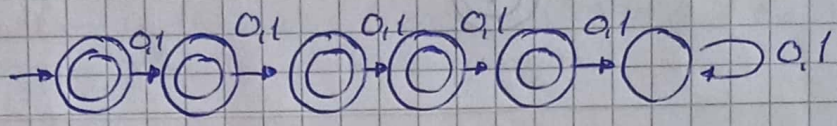
c) $L = \{w \mid w$ contains the substring 0101, ie $w = x0101y$ for some x and $y\}$



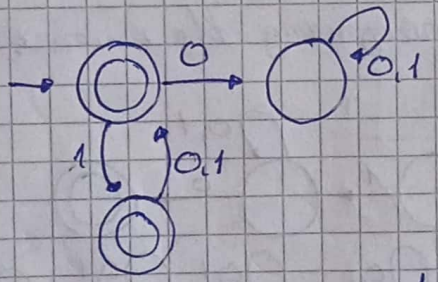
e) $L = \{w \mid w$ starts with 0 and has odd length or starts with 1 and has even length$\}$



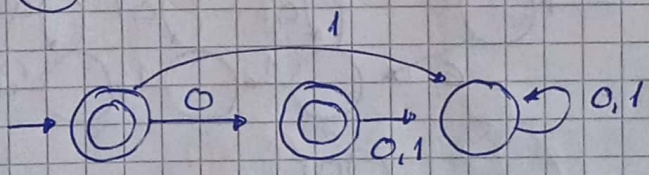
g) $L = \{w \mid w$ length of w is at most 5$\}$



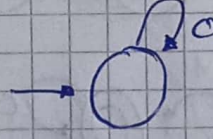
i) $L = \{w \mid w$ every odd position of w is a 1$\}$



k) $L = \{\epsilon, 0\}$

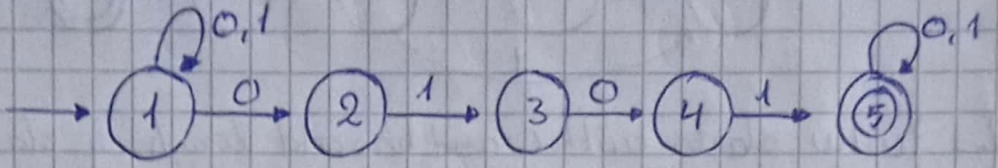


m) $L = \{$ The empty set $\}$

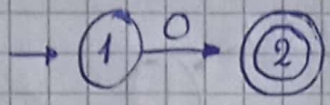


1.7 b,d,g

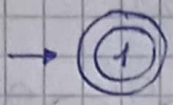
b) $L = \{w \mid w$ contains the substring 0101 ie $w = x0101y$ for more x and $y\}$



d) The language $\{0\}$ with two states



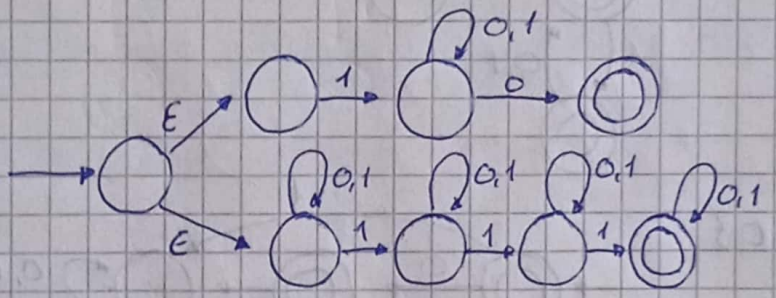
g) The language $\{\varepsilon\}$ with one states



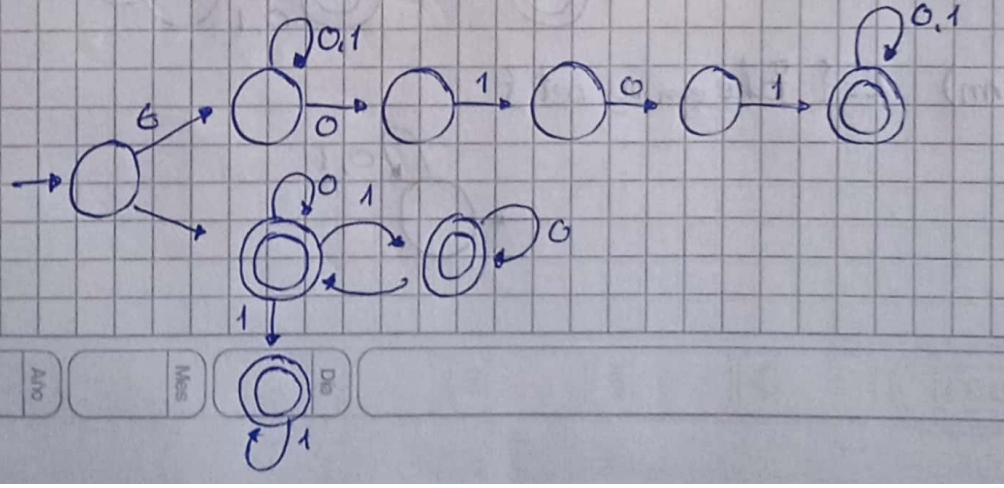
1.8

Use the construction in the proof of Theorem 1.45 to give the state diagrams of NFAms recognizing the union of the languages

a)

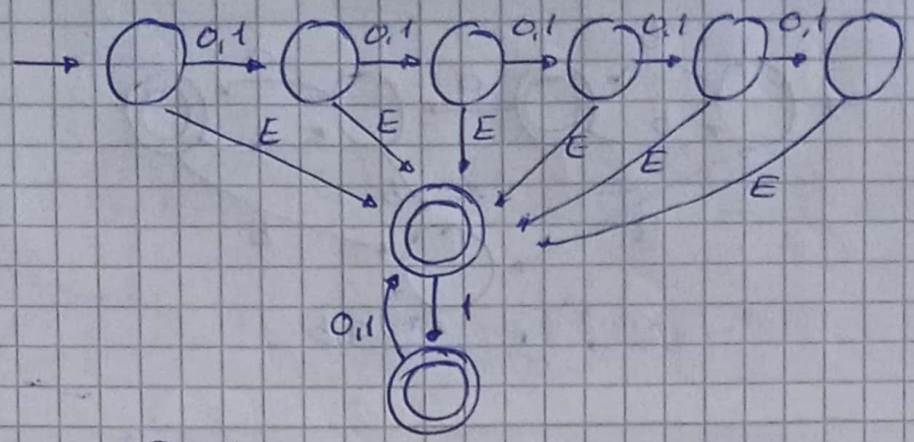


b)

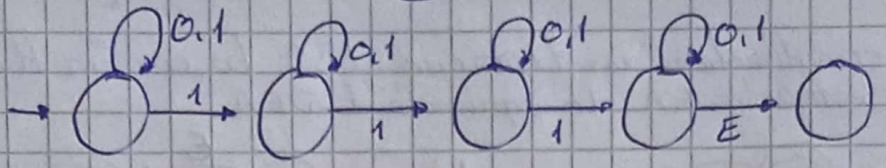


1.9 Use the construction in the proof of theorem to give the state diagrams of NFAs recognizing the concatenation of the language

a)



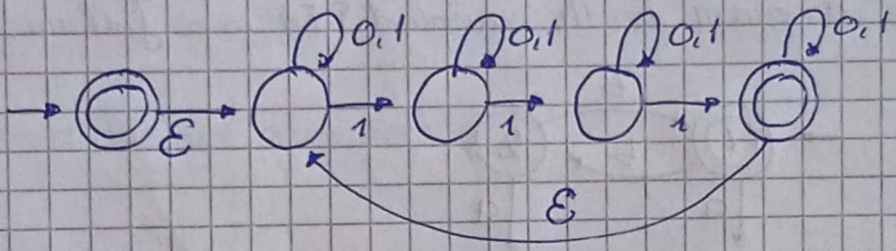
b)



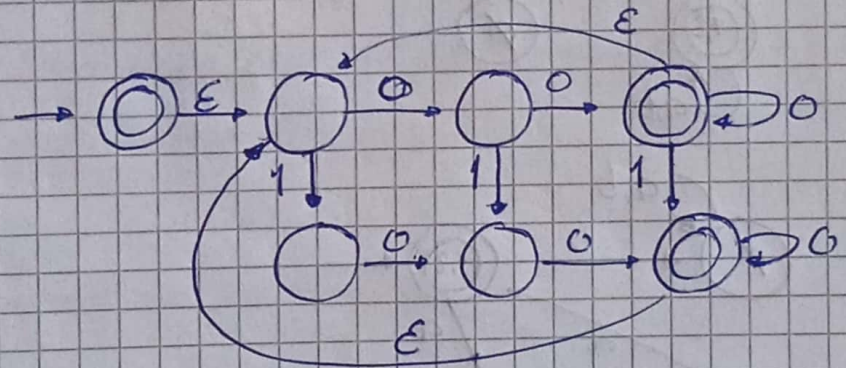
1.10

Use the construction in the proof theorem 1.49 to give the state diagrams of NFAs recognizing the star of the languages

a)

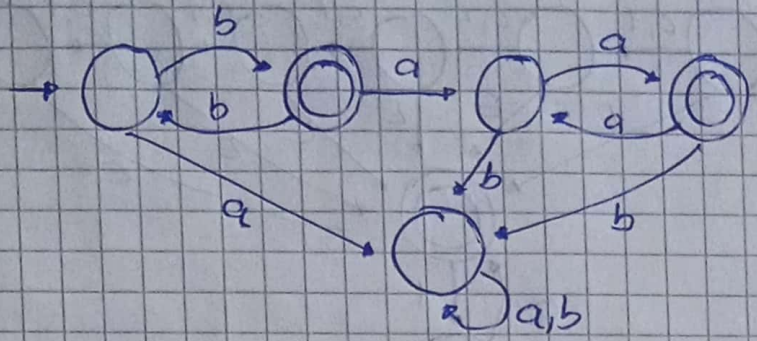


b)



1.12

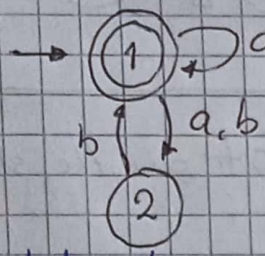
diagram of M is follows:



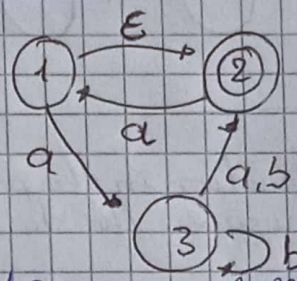
1.16

Use the construction in Theorem 1.39 to convert the following to nondeterministic F.A. to equivalent DFA.

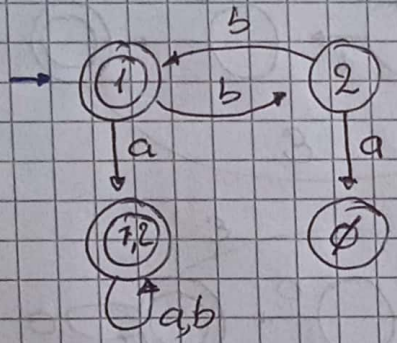
a)



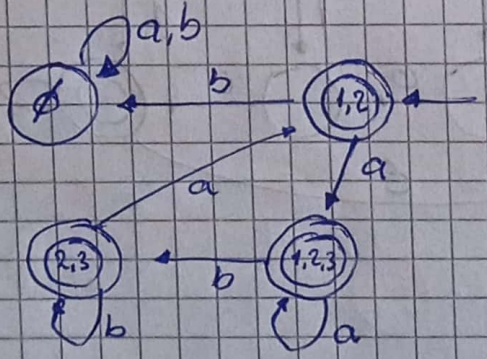
b)



The state diagram for the equivalent DFA is a follows

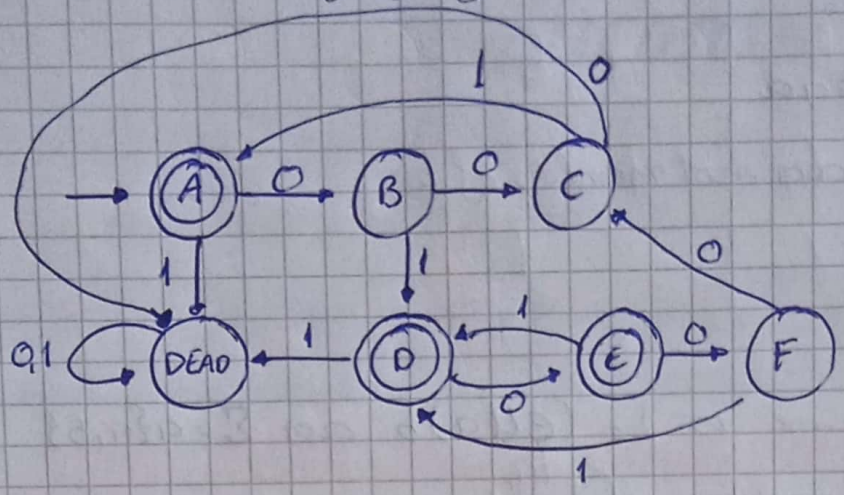


b)



1.17

a) Give an NFA recognizing the language $(01 \cup 001 \cup 010)^*$



1.20 a. c. e g

a) $a^* b^*$

Language is $L = a^* b^*$ over the alphabet $\Sigma = \{a, b\}$

Strings that are member of L

- ab
- abb

Strings that are not members of L

- ba
- bba

c) Given language is $L = a^* \cup b^*$ over $\Sigma = \{a, b\}$

Strings tha are members of L

- aaa
- bbb

Strings tha are not members of L

- baab
- bbaa

e) Given language is $L = \Sigma^* a \Sigma^* b \Sigma^* a \Sigma^*$ over $\Sigma = \{a, b\}$

Strings tha are members of L

- aba
- aabbaa

Strings tha over not members of L

- a
- b

g) Given language is $L = (\epsilon \cup a)b$ over $\Sigma = a\{a, b\}$

Strings that are members of L

- b
- ab

Strings that are not members of L

- a
- ba