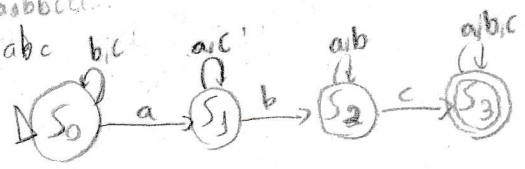


1. a) $\{uavbxcy \mid u,v,x,y \in \{a,b,c\}^*\}$ $E = \{S_0, S_1, S_2, S_3\}$

abc
aabbcc
bcabc

$\Sigma = \{a,b,c\}$
 $i = S_0$
 $F = \{S_3\}$

δ	a	b	c
S_0	S_1	S_0	S_0
S_1	S_1	S_2	S_1
S_2	S_2	S_2	S_3
S_3	S_3	S_3	S_3

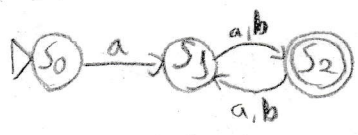


b) $\{W \in \{a,b\}^* \mid W \text{ começa com } a \text{ e tem tamanho par}\}$

aa
ab
aabb
abab

$E = \{S_0, S_1, S_2\}$
 $\Sigma = \{a,b\}$
 $i = S_0$
 $F = \{S_2\}$

δ	a	b
S_0	S_1	X
S_1	S_2	S_2
S_2	S_1	S_1

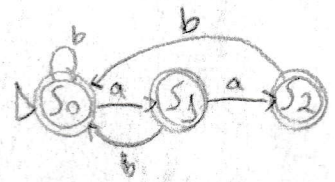


c) $\{W \in \{a,b\}^* \mid W \text{ nunca tem mais de dois a's consecutivos}\}$

a
aa
aab
aaba
aabb
aaa

$E = \{S_0, S_1, S_2\}$
 $\Sigma = \{a,b\}$
 $i = S_0$
 $F = \{S_0, S_1, S_2\}$

δ	a	b
S_0	S_1	S_0
S_1	S_2	S_0
S_2	X	S_0

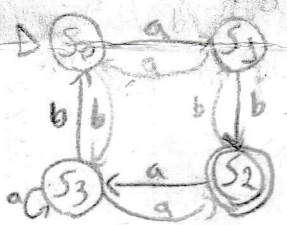


d) $\{W \in \{a,b\}^* \mid W \text{ tem um número ímpar de a's}\}$

ab
ababab
ababababab

$E = \{S_0, S_1, S_2, S_3\}$
 $\Sigma = \{a,b\}$
 $i = S_0$
 $F = \{S_2\}$

δ	a	b
S_0	S_1	X
S_1	X	S_2
S_2	S_3	X
S_3	X	S_0

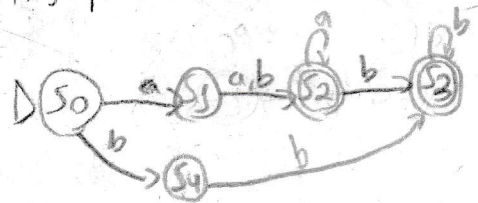


e) $\{W \in \{a,b\}^* \mid |W| \geq 2 \text{ e os a's (repetidos) precedem os b's (repetidos)}\}$

ab
aabb
aabb

$E = \{S_0, S_1, S_2\}$
 $\Sigma = \{a,b\}$
 $i = S_0$
 $F = \{S_2\}$

δ	a	b
S_0	S_1	S_4
S_1	S_2	S_2
S_2	S_2	S_3
S_3	X	S_3
S_4	X	S_3

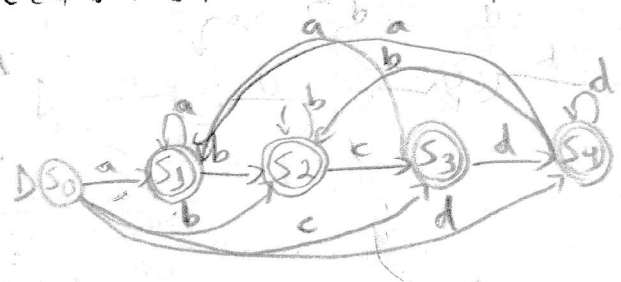


f) $\{W \in \{a,b,c,d\}^* \mid \text{os a's (repetidos) precedem os b's (repetidos) e os c's (repetidos) precedem os d's (repetidos)}\}$

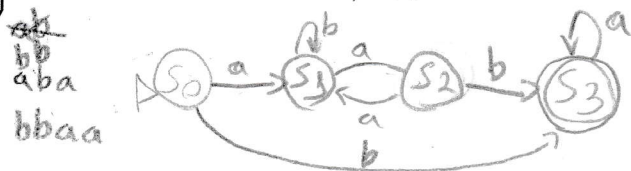
abcd
acbd
acbd

$E = \{S_0, S_1, S_2, S_3, S_4\}$
 $\Sigma = \{a,b,c,d\}$
 $i = S_0$
 $F = \{S_4\}$

δ	a	b	c	d
S_0	S_1	X	X	X
S_1	S_1	S_2	S_1	X
S_2	X	S_2	S_3	X
S_3	X	S_3	S_3	S_4
S_4	X	X	X	S_4

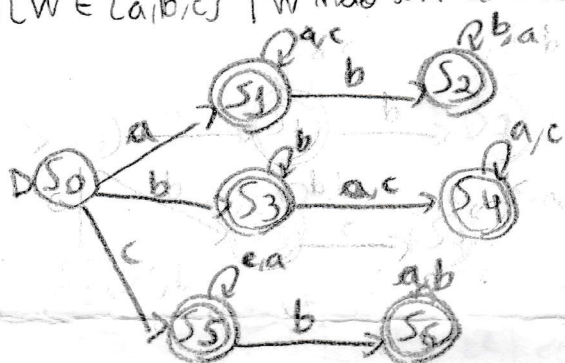


g) $\{xba^n \mid x \in \{a,b\}^*, n \geq 0 \text{ e } x \text{ tem um número par de } a's\}$



h) $\{x a^m b a^n \mid x \in \{a,b\}^*, m+n \text{ par e } x \text{ não termina em } a\}$

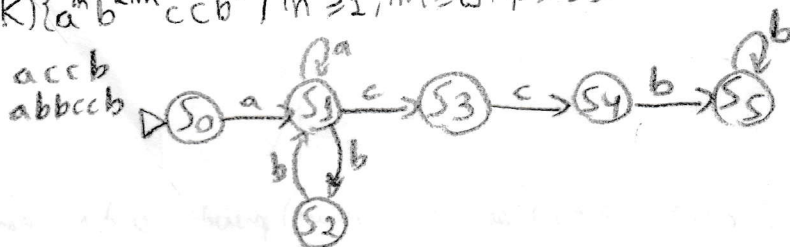
i) $\{w \in \{a,b,c\}^* \mid w \text{ não tem } abc \text{ como subpalavra}\}$



j) $\{a^n b^m c^p \mid m \geq 0, n \geq 0, p \geq 0\}$

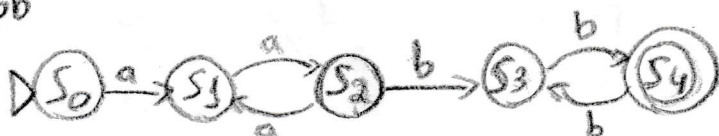


k) $\{a^n b^{2m} c c b^p \mid n \geq 1, m \geq 0, p \geq 1\}$



l) $\{a^{2m} b^{2m} \mid m \geq 0, m \geq 0\}$

aabb



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

a) L_1 é a linguagem mais simples que existe: não contém palavras.

$L_1 = \emptyset$

b) L_2 é a linguagem que contém uma única palavra: a palavra vazia.

$L_2 = \{\lambda\}$

c) L_3 é a linguagem que contém uma única palavra: 0.

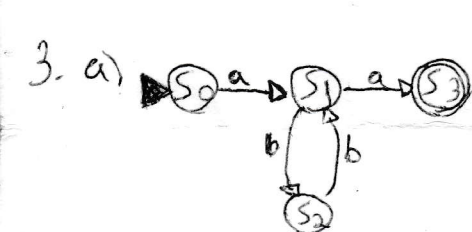
$L_3 = \{0\}$

d) L_4 é a linguagem que contém duas palavras: λ e 0.

$L_4 = \{\lambda, 0\}$

e) L_5 é a linguagem constituída de toda palavra de tamanho par cuja primeira metade não contém 0's e cuja segunda metade não contém 1's. Esta linguagem também é conhecida como duplo-lol.

$L_5 = \{a^m b^m / m \geq 0\}$



$L = \{ab^{2m}a / m \geq 0\}$

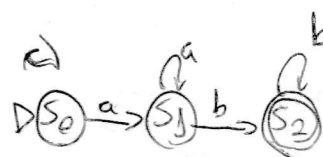
$E = \{S_0, S_1, S_2, S_3\}$

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

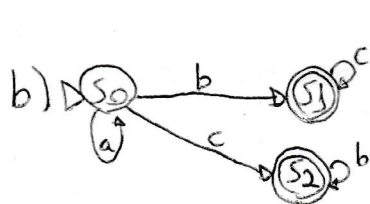
$i = S_0$

$F = \{S_3\}$

δ	a	b
S_0	S_1	X
S_1	S_3	S_2
S_2	X	S_1
S_3	X	X



$L = \{aa^n bb^m / m \geq 0, n \geq 0\}$



$L = \{a^n (bc^m + cb^m) / m \geq 0, n \geq 0\}$

$E = \{S_0, S_1, S_2\}$

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

$i = S_0$

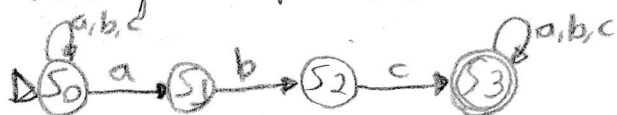
$F = \{S_1, S_2\}$

δ	a	b	c
S_0	S_0	S_1	S_2
S_1	X	X	S_1
S_2	X	S_2	X

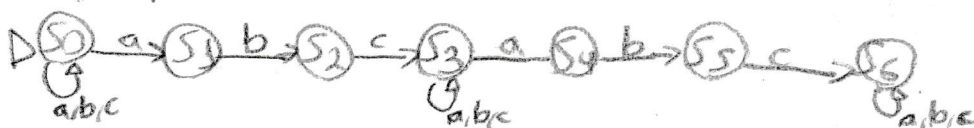
$\neq AFND$

$\{0, b, c\}$

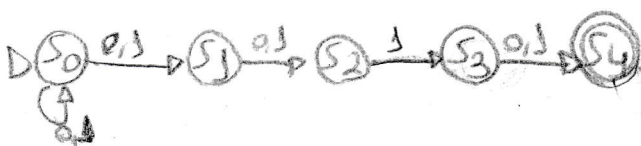
1) a) o conjunto de palavras com no mínimo 3 ocorrências de abc.



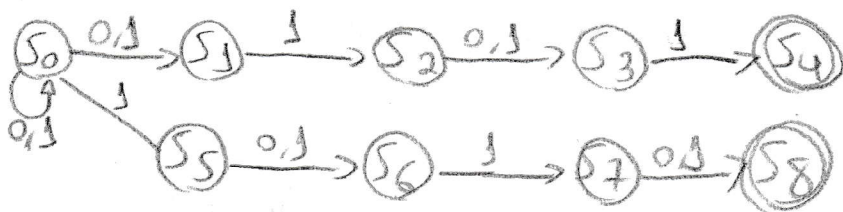
b) o conjunto de palavras com no mínimo 2 ocorrências de abc.



c) $\{w \in \{0, 1\}^* / |w| \geq 4 \text{ e o primeiro símbolo é } 1\}$



d) $\{w \in \{0,1\}^* \mid 00 \text{ não aparece nos últimos 4 símbolos de } w\}$



2) a) $L = \varepsilon^*$ para $\Sigma = \{a,b\}$



c) $L = aa$ para $\Sigma = \{a,b\}$



b) $L = a$ para $\Sigma = \{a,b\}$



d) $L = a^*$ para $\Sigma = \{a,b\}$



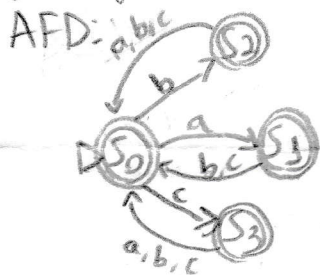
e) $L = \{\}$ para $\Sigma = \{a,b\}$



f) $L = \{a^m b^n \mid m \geq 0\}$ para $\Sigma = \{a,b\}$



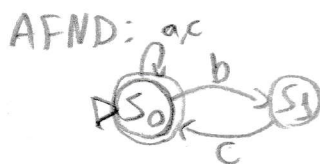
g) Conjunto de todas as palavras que não contém a sobre o alfabeto $\Sigma = \{a,b,c\}$



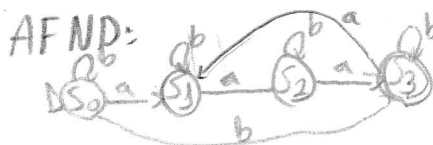
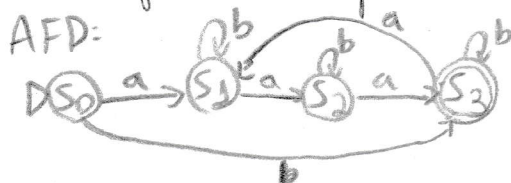
AFND:



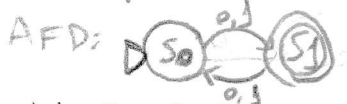
h) Conjunto de todas as palavras sobre $\Sigma = \{a,b,c\}$ onde cada b é seguido de pelo menos 1 c



i) Conjunto de strings sobre $\Sigma = \{a,b\}$ onde o número de a é divisível por 3.



j) Conjunto de strings sobre $\Sigma = \{0,1\}$ e w tem tamanho ímpar



AFND: //

k) $L = \{a^m b^{2m} \mid m \geq 0 \text{ e } m \geq 0\}$ l) $L = \{zw \mid w \text{ pertence a } \{z,m\}^*\}$

