Jônatas M. de Brito - 422569

1ª Avaliação Parcial
Curso: Engenharia da Computação
Disciplina: Teoria dos Autômatos e Linguagens Formais
Prof. Jarbas Joaci de Mesquita Sá Junior
Universidade Federal do Ceará – UFC/Sobral

1. Desenvolva autômatos finitos determinísticos (AFD) que reconheçam as seguintes linguagens sobre $\Sigma = \{a, b\}$: (2,0 pontos)

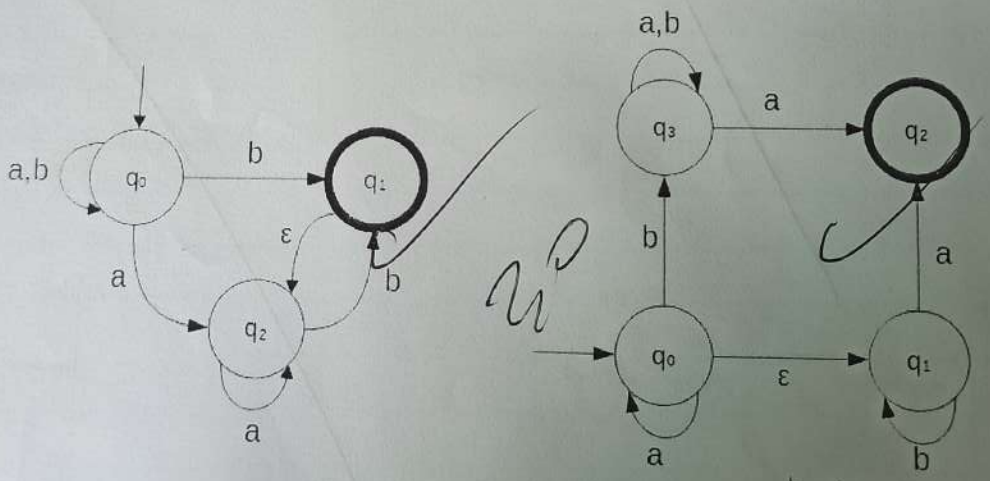
   a) {w | w possui ba como subpalavra}
   b) {w | possui número ímpar de a e b}

2. Desenvolva gramáticas regulares para as linguagens da questão precedente. (2,0 pontos)

3. Desenvolva autômatos finitos não determinísticos (AFN ou AFNε) que reconheçam as seguintes linguagens sobre $\Sigma = \{a, b\}$: (2,0 pontos)

   a) {w | ab ou ba é subpalavra e aa é sufixo de w}
   b) {w | w contém um número ímpar de as ou contém exatamente três bs}

4. Converta os seguintes autômatos nos AFD's equivalentes. (2,0 pontos)



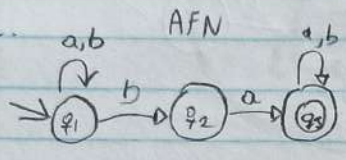
5. Traduza as seguintes expressões regulares em autômatos finitos: (2,0 pontos)

   a) ab(b*+ba*)*b
   b) a*(bb)*b

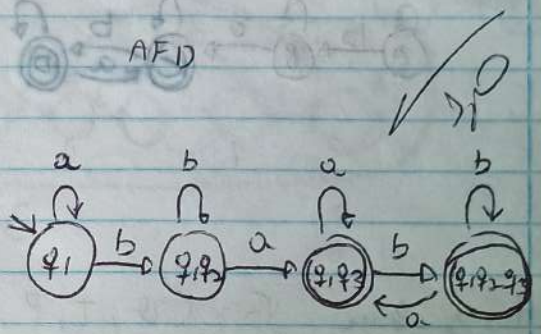
Jônatas M. de Brito 422569

1:

a. AFN



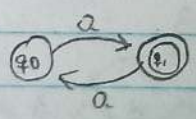
AFD



	a	b
→ q_1	q_1	$q_1 q_2$
q_2	q_3	$\emptyset$
F q_3	q_3	q_3
* $q_1 q_2$	$q_1 q_3$	$q_1 q_2$
F $q_1 q_3$	$q_1 q_3$	$q_1 q_2 q_3$
F $q_1 q_2 q_3$	$q_1 q_3$	$q_1 q_2 q_3$

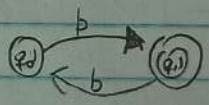
b.

• impar de a

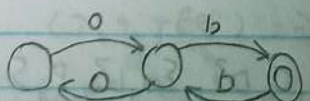


=

• impar de b

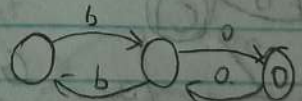


a e b impar

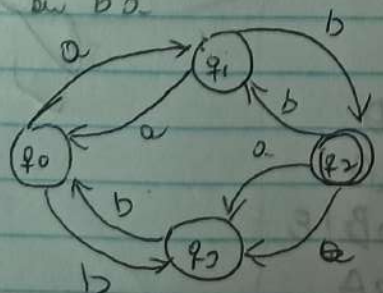


=

b e a impar

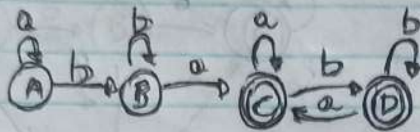


• a e b ou ba



2-

a. · transformando os os vértices em letras, ou facilita



temos que G = (V, T, P, S)

G = ({A, B, C, D}, {a, b}, P, S = A)

· P

S ⇒ A

A ⇒ aA | bB

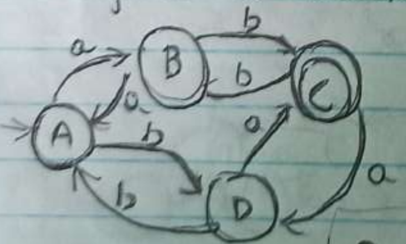
B ⇒ aC | bB

C ⇒ aC | bD | ε

D ⇒ aC | bD | ε

b.

· transformando os vértices em letras



temos que G: (V, T, P, S)

G = ({A, B, C, D}, {a, b}, P, S = A)

P.

S ⇒ A

A ⇒ aB | bD

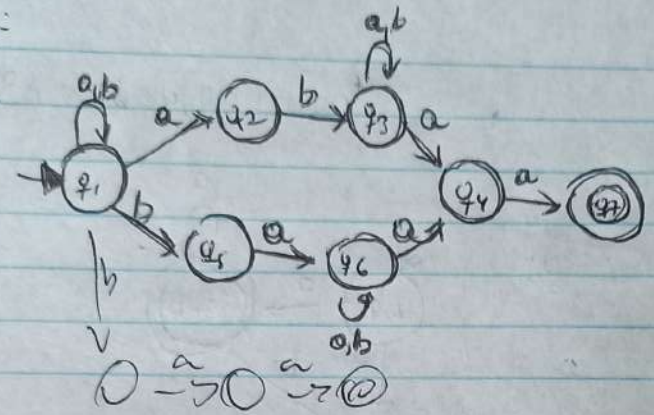
B ⇒ bC | aA

C ⇒ aD | bB | ε

D ⇒ aC | bA

3:

a.

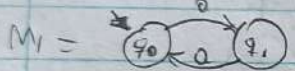


aaaabbaaa

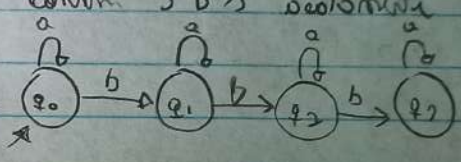
4/0,8

b.

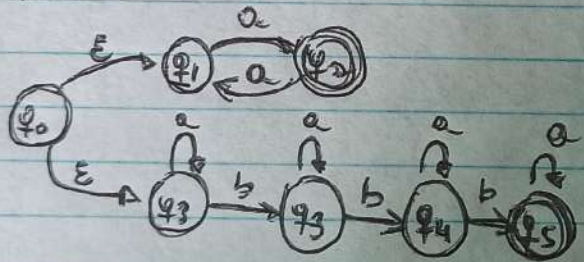
• número impar de a's



• contém 3 b's consecutivos



$M_1 \cup M_2$



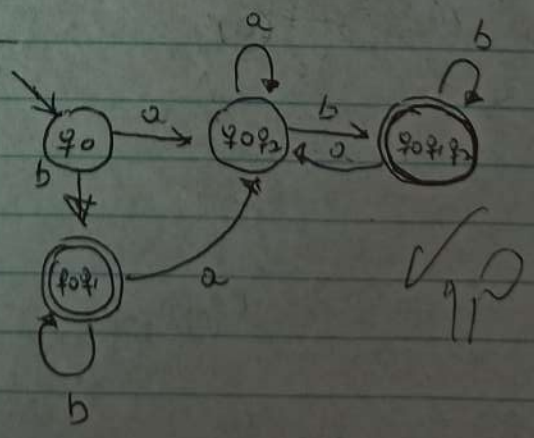
1,0

4:

• $AFN_\varepsilon \rightarrow AFD$

• δ

	a	b
∅	∅	∅
q_0	q_0q_2	q_0q_1
q_1	∅	∅
q_2	q_2	q_1q_2
q_0q_1	q_0q_2	q_0q_1
q_0q_2	q_0q_2	$q_0q_1q_2$
q_1q_2	q_2	q_1q_2
$q_0q_1q_2$	q_0q_2	$q_0q_1q_2$



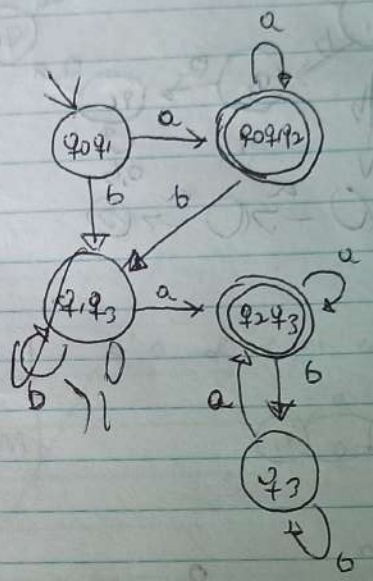
1,0

4:

b. $AFN_\varepsilon \rightarrow AFD$

δ

	a	b
q_0	q_0q_1	q_3
q_1	q_2	q_1
q_2	$\emptyset$	$\emptyset$
q_3	q_2q_3	q_3
q_0q_1	$q_0q_1q_2$	q_1q_3
q_2q_3	q_2q_3	q_3
q_1q_3	q_2q_3	q_1q_3
$q_0q_1q_2$	$q_0q_1q_2$	q_1q_3



5. a. $ab(b^* + ba^*)^*b$

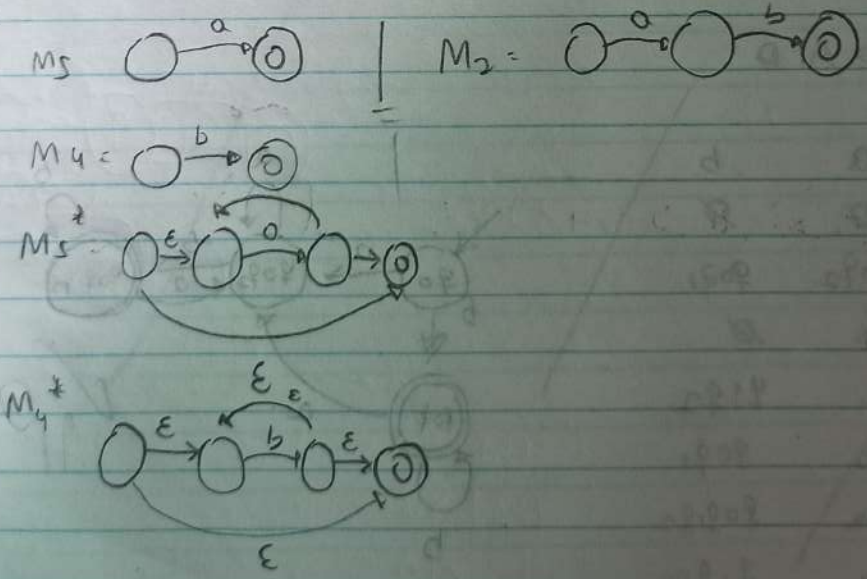
$R_1 = ab(b^* + ba^*)^*b = R_2 . (R_4^* + (R_4 . R_5^*)^* R_4$

$R_2 = ab \Rightarrow R_5 . R_4$

$R_3 = (b^* + ba^*)^* \Rightarrow (R_4^* \cup R_4 R_5^*)^*$

$R_4 = b$

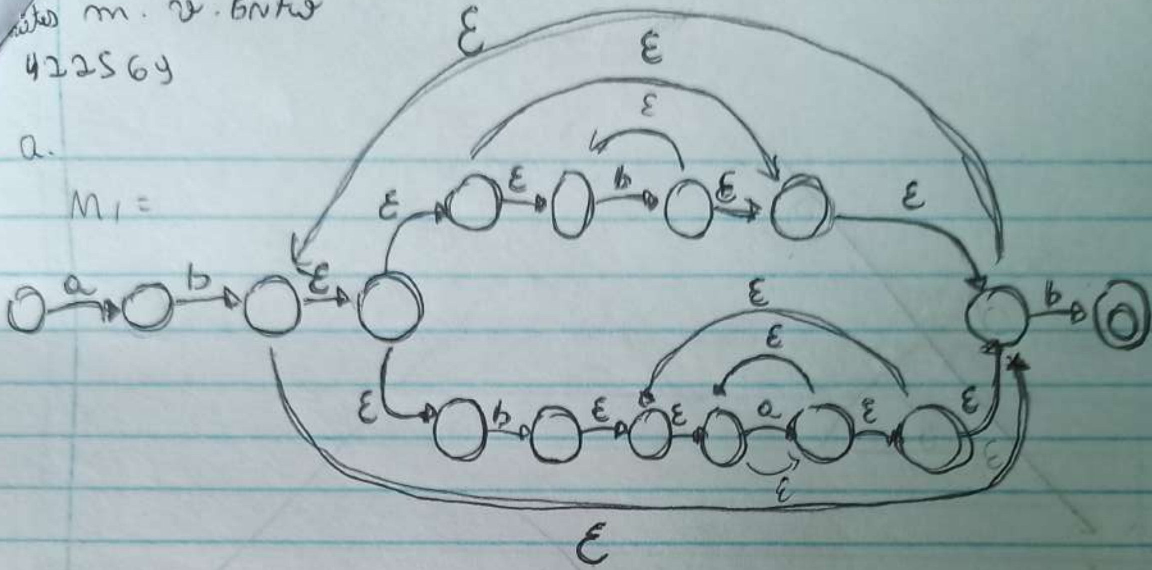
$R_5 = a$



...ites m. v. Brito
412564

5 a.

M_1 =



5. b.

$a^*(bb)^*b$

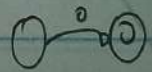
$R_1 = a^*(bb)^*b$

$R_2 = a$

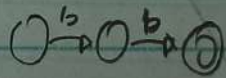
$R_3 = bb$

$R_4 = b$

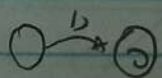
M_2 =



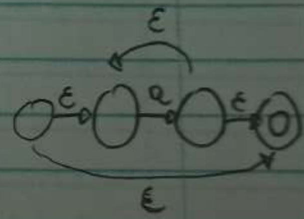
M_3 =



M_4 =



M_2^* =



M_3^* =