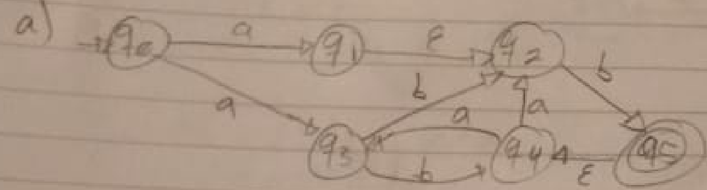
Tarea 15

1.- Dados los AFNs mostrados en los figuras siguientes, encontrar la expresión regular que acepta cada uno de ellos.

a)



$A_0 = aA_1 \cup aA_3$
$A_1 = A_2$
$A_2 = bA_5 \cup \varepsilon$
$A_3 = bA_2 \cup bA_4$
$A_4 = aA_2 \cup aA_3$
$A_5 = A_4$

$A_3 = bA_2 \cup b(aA_2 \cup aA_3)$
$A_3 = bA_2 \cup baA_2 \cup baA_3$
$A_3 = baA_3 \cup (bA_2 \cup baA_2)$
$A_3 = (ba)^*(b \cup ba)A_2$

$A_4 = aA_2 \cup a(ba)^*(b \cup ba)A_2$
$A_4 = (a \cup a(ba)^*(b \cup ba))A_2$

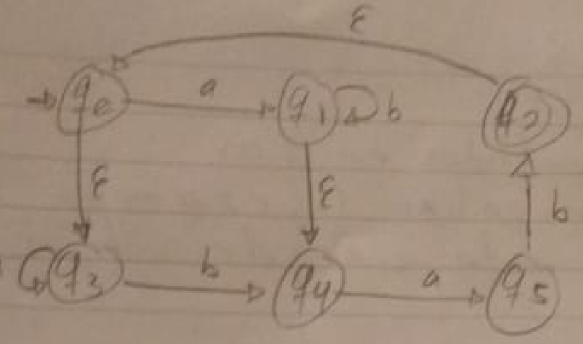
$A_5 = A_4$

$A_2 = b(a \cup a(ba)^*(b \cup ba))A_2 \cup \varepsilon$
$A_2 = (b(a \cup a(ba)^*(b \cup ba)))^*$

$A_3 = (ba)^*(b \cup ba) \cdot (b(a \cup a(ba)^*(b \cup ba)))^*$
$A_1 = A_2$

$A_0 = a(b(a \cup a(ba)^*(b \cup ba))^* \cup b(ba)^*(b \cup ba)(b(a \cup a(ba)^*(b \cup ba)))^*$

b)



$A_0 = aA_1 \cup A_3$
$A_1 = bA_1 \cup A_4$
$A_2 = A_0 \cup \varepsilon$
$A_3 = aA_3 \cup bA_4$
$A_4 = aA_5$
$A_5 = bA_2$

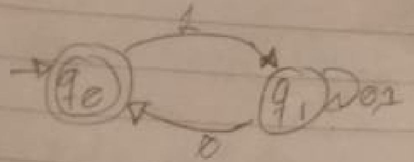
$A_4 = abA_2$

$A_3 = a^* bA_4$
$A_3 = a^* babA_2$

$A_1 = b^* A_4$
$A_1 = b^* abA_2$

$A_0 = ab^*abA_2 \cup a^* babA_2$
$A_0 = ab^* ab(A_0 \cup \varepsilon) \cup a^* bab(A_0 \cup \varepsilon)$
$A_0 = ab^*abA_0 \cup ab^*ab \cup a^*babA_0 \cup a^*bab$
$A_0 = (ab^*ab \cup a^*bab)A_0 \cup (ab^*ab \cup a^*bab)$
$A_0 = (ab^*ab \cup a^*bab)^*(ab^*ab \cup a^*bab)$

c)

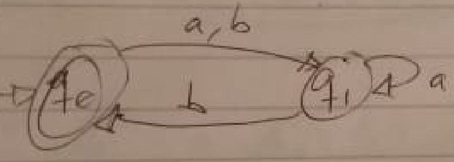


$A_0 = 1A_1 \cup \varepsilon$
$A_1 = 0A_0 \cup 0A_1 \cup 1A_1$

$A_1 = (0 \cup 1)A_1 \cup 0A_0$
$A_1 = (0 \cup 1)^* 0A_0$

$A_0 = 1(0 \cup 1)^* 0A_0 \cup \varepsilon$
$A_0 = (1(0 \cup 1)^* 0)^*$

d)

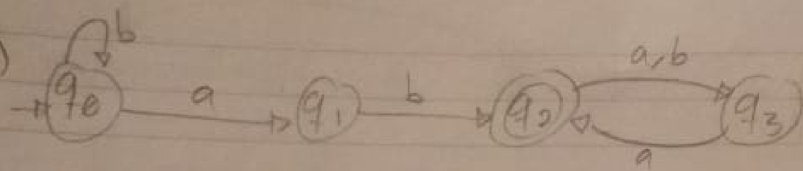


regex = $((a \cup b)a^*b)^*$

$A_0 = aA_1 \cup bA_1 \cup \varepsilon$
$A_1 = aA_1 \cup bA_0$

$A_1 = a^*bA_0$
$A_0 = aa^*bA_0 \cup ba^*bA_0 \cup \varepsilon$
$A_0 = (aa^*b \cup ba^*b)A_0 \cup \varepsilon$
$A_0 = (aa^*b \cup ba^*b)^*$ $= ((a \cup b)a^*b)^*$

e)



regex = $b^* ab \cdot ((a \cup b)a)^*$

- $A_0 = aA_1 \cup bA_0$
- $A_1 = bA_2$

$A_2 = aA_3 \cup bA_3 \cup \varepsilon$

$A_3 = aA_2$

$A_2 = aaA_2 \cup baA_2 \cup \varepsilon$

$A_2 = (aa \cup ba)A_2 \cup \varepsilon$

- $A_2 = (aa \cup ba)^*$

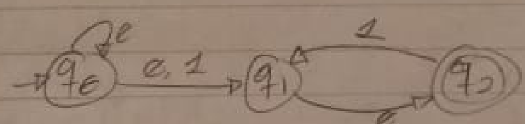
- $A_1 = b(aa \cup ba)^*$

$A_0 = ab(aa \cup ba)^* \cup bA_0$

$A_0 = b^* ab(aa \cup ba)^*$

$A_0 = b^* ab((a \cup b)a)^*$

f)



regex = $0^*(0 \cup 1)(01)^*$

- $A_0 = 0A_0 \cup 0A_1 \cup 1A_1$
- $A_1 = 0A_2$

$A_2 = 1A_1 \cup \varepsilon$

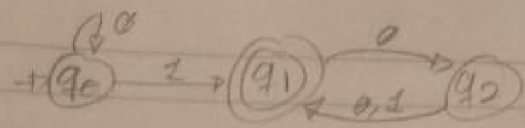
$A_1 = 0(1A_1 \cup \varepsilon)$

$A_1 = 01A_1 \cup \varepsilon$

$A_1 = (01)^*$

$A_0 = aA_0 \cup 0(01)^* \cup 1(01)^*$

$A_0 = a^*(0(01)^* \cup 1(01)^*) = a^*(0 \cup 1)(01)^*)$

g) 

$0^* 1(0(0 \cup 1))^*$

$A_0 = 0A_0 \cup 1A_1$

$^*A_1 = 0A_2 \cup \varepsilon$

$A_2 = 0A_1 \cup 1A_1$

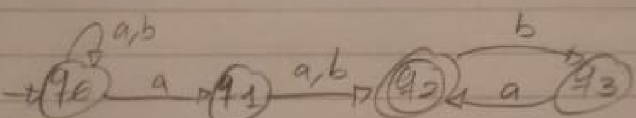
$\underline{A_2 = (0 \cup 1)A_1}$

$A_1 = 0(0 \cup 1)A_1 \cup \varepsilon$

$A_1 = (0(0 \cup 1))^*$

$A_0 = 0A_0 \cup 1(0(0 \cup 1))^*$

$\underline{A_0 = 0^*1(0(0 \cup 1))^*}$

h) 

regex = $(a \cup b)^* a (a \cup b)(ba)^*$

• $A_0 = aA_0 \cup aA_1 \cup bA_0$

• $A_1 = aA_2 \cup bA_2$

$A_2 = bA_3 \cup \varepsilon$

$A_3 = aA_2$

$A_2 = baA_2 \cup \varepsilon$

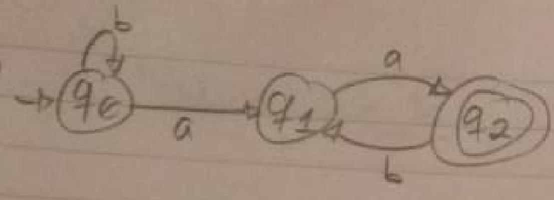
$\underline{A_2 = (ba)^*}$

$A_1 = (a \cup b)A_2$

$\underline{A_1 = (a \cup b)(ba)^*}$

$A_0 = (a \cup b)A_0 \cup a(a \cup b)(ba)^*$

$\underline{A_0 = (a \cup b)^* a (a \cup b)(ba)^*}$

i) 

regex = $b^* a a (ba)^* = b^* a^2 (ba)^*$

- $A_0 = aA_1 \cup bA_0$
- $A_1 = aA_2$

$A_2 = bA_1 \cup \varepsilon$

$A_1 = a(bA_1 \cup \varepsilon)$

$A_1 = abA_1 \cup a$

$A_1 = (ab)^* a$

$A_0 = b^* a A_1$

$\underline{A_0 = b^* a (ab)^* a}$ //