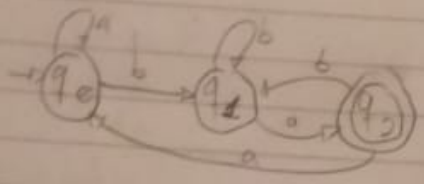
Tarea 11

$A = rA \cup s$
$A = r^* s$

Dado los AFDs mostrados en las figuras siguientes, encontra la expresión regular que acepta cada uno de ellos

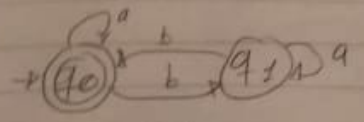
a)



$A_0 = aA_0 \cup bA_1$
$A_1 = aA_2 \cup bA_1$
$A_2 = \varepsilon \cup aA_0 \cup bA_1$

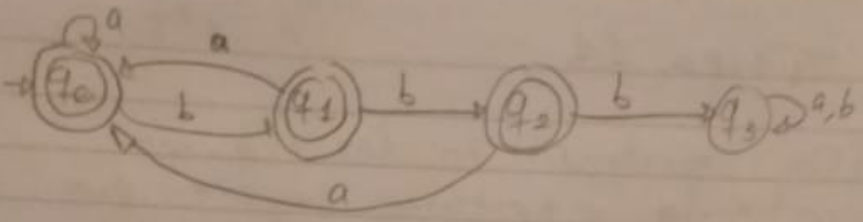
$A_1 = a(\varepsilon \cup aA_0 \cup bA_1) \cup bA_1$
$A_1 = a \cup aaA_0 \cup abA_1 \cup bA_1$
$A_1 = (ab \cup b)A_1 \cup a \cup aaA_0$
$A_1 = (ab \cup b)^*(a \cup aaA_0)$
$A_0 = aA_0 \cup b(ab \cup b)^*(a \cup aaA_0)$
$A_0 = aA_0 \cup b(ab \cup b)^* a \cup b(ab \cup b)^* aaA_0$
$A_0 = (a \cup b(ab \cup b)^* aa)^* b(ab \cup b)^* a$

b)



$A_0 = aA_0 \cup bA_1 \cup \varepsilon$
$A_1 = aA_1 \cup bA_0$
$A_1 = a^* bA_0$
$A_0 = aA_0 \cup ba^* bA_0 \cup \varepsilon$
$A_0 = (a \cup ba^* b)A_0 \cup \varepsilon$
$A_0 = (a \cup ba^* b)^*$

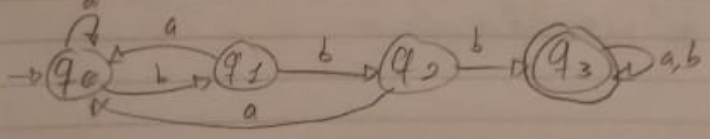
c)



$A_0 = a A_0 \cup b A_1 \cup \varepsilon$
$A_1 = a A_0 \cup b A_2 \cup \varepsilon$
$A_2 = a A_0 \cup b A_3 \cup \varepsilon$
$A_3 = a A_3 \cup b A_3$

$A_3 = \emptyset$
$A_2 = a A_0 \cup \varepsilon$
$A_1 = a A_0 \cup b(a A_0 \cup \varepsilon) \cup \varepsilon$
$A_1 = a A_0 \cup b a A_0 \cup b \cup \varepsilon$
$A_1 = (a \cup ba) A_0 \cup b \cup \varepsilon$
$A_0 = a A_0 \cup b((a \cup ba) A_0 \cup b \cup \varepsilon) \cup \varepsilon$
$A_0 = a A_0 \cup b(a \cup ba) A_0 \cup bb \cup b \cup \varepsilon$
$A_0 = (a \cup b(a \cup ba)) A_0 \cup bb \cup b \cup \varepsilon$
$A_0 = (a \cup b(a \cup ba))^* (bb \cup b \cup \varepsilon)$

d)

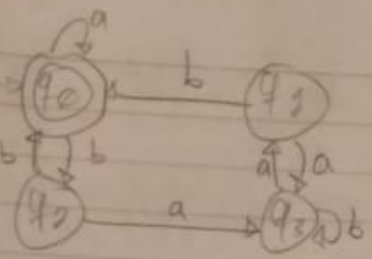


$A_0 = a A_0 \cup b A_1$
$A_1 = a A_0 \cup b A_2$
$A_2 = a A_0 \cup b A_3$
$A_3 = a A_3 \cup b A_2 \cup \varepsilon$

$A_3 = (a \cup b) A_3 \cup \varepsilon$
$A_3 = (a \cup b)^*$
$A_2 = a A_0 \cup b(a \cup b)^*$
$A_1 = a A_0 \cup b(a A_0 \cup b(a \cup b)^*)$
$A_1 = a A_0 \cup b a A_0 \cup bb(a \cup b)^*$
$A_1 = (a \cup ba) A_0 \cup bb(a \cup b)^*$
$A_0 = a A_0 \cup b((a \cup ba) A_0 \cup bb(a \cup b)^*) \cup \varepsilon$

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

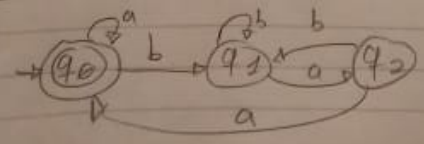
e)



$A_e = aA_e \cup bA_2 \cup \varepsilon$
$A_1 = aA_3 \cup bA_0$
$A_2 = aA_3 \cup bA_e$
$A_3 = aA_1 \cup bA_3$
λ

$A_3 = b^* aA_1$
$A_2 = ab^* aA_1 \cup bA_e$
$A_1 = a(ab^* aA_1 \cup bA_e) \cup bA_e$
$A_1 = aab^* aA_1 \cup abA_e \cup bA_e$
$A_1 = (aab^* a)^* (ab \cup b) A_e$
$A_2 = ab^* a(aab^* a)^* (ab \cup b) A_e \cup bA_e$
$A_2 = (ab^* a(aab^* a)^* (ab \cup b) \cup b) A_e$
$A_e = aA_e \cup b(ab^* a(aab^* a)^* (ab \cup b) \cup b) A_e \cup \varepsilon$
$A_e = (a \cup b(ab^* a(aab^* a)^* (ab \cup b) \cup b) A_e \cup \varepsilon$
$A_e = (a \cup b(ab^* a(aab^* a)^* (ab \cup b) \cup b)^*$

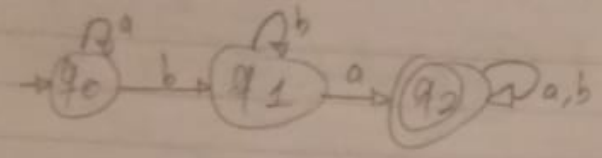
f)



$A_e = aA_e \cup bA_1 \cup \varepsilon$
$A_1 = aA_2 \cup bA_1$
$A_2 = aA_e \cup bA_1$

$A_1 = a(aA_e \cup bA_1) \cup bA_1$
$A_1 = aaA_e \cup abA_1 \cup bA_1$
$A_1 = (ab \cup b)A_1 \cup aaA_e$
$A_1 = (ab \cup b)^* aaA_e$
$A_e = aA_e \cup b(ab \cup b)^* aaA_e \cup \varepsilon$
$A_e = (a \cup b(ab \cup b)^* aa)A_e \cup \varepsilon$
$A_e = (a \cup b(ab \cup b)^* aa)^*$

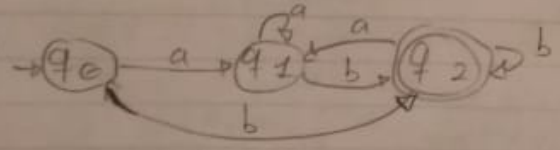
a)



$A_e = \varepsilon A_e \cup b A_1$
$A_1 = a A_2 \cup b A_1$
$A_2 = a A_2 \cup b A_2 \cup \varepsilon$

$A_2 = (a \cup b) A_2 \cup \varepsilon$
$A_2 = (a \cup b)^*$
$A_1 = a (a \cup b)^* \cup b A_1$
$A_1 = b^* a (a \cup b)^*$
$A_0 = a A_e \cup b b^* a (a \cup b)^*$
$A_e = a^* b b^* a (a \cup b)^*$

b)



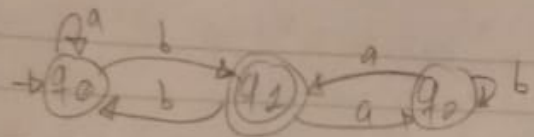
$A_e = a A_1 \cup b A_2$
$A_1 = a A_1 \cup b A_2$
$A_2 = a A_1 \cup b A_2 \cup \varepsilon$

$A_2 = b^* (a A_1 \cup \varepsilon)$
$A_1 = a A_1 \cup b b^* (a A_1 \cup \varepsilon)$
$A_1 = a A_1 \cup b^+ a A_1 \cup b b^*$
$A_1 = (a \cup b b^* a) A_1 \cup b b^*$
$A_1 = (a \cup b b^* a)^* b b^*$

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

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

i)

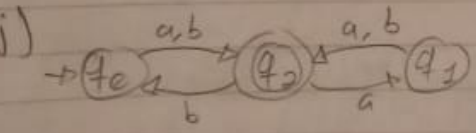


$A_{q_0} = a A_{q_0} \cup b A_{q_1}$
$A_{q_1} = a A_{q_2} \cup b A_{q_0} \cup \varepsilon$
$A_{q_2} = a A_{q_1} \cup b A_{q_2}$

$A_{q_2} = b^* a A_{q_1}$
$A_{q_1} = a b^* a A_{q_1} \cup b A_{q_0} \cup \varepsilon$
$A_{q_1} = (a b^* a)^* (b A_{q_0} \cup \varepsilon)$

$A_{q_0} = a A_{q_0} \cup b (a b^* a)^* (b A_{q_0} \cup \varepsilon)$
$A_{q_0} = a A_{q_0} \cup b (a b^* a)^* b A_{q_0} \cup b (a b^* a)^*$
$A_{q_0} = (a \cup b (a b^* a)^* b) A_{q_0} \cup b (a b^* a)^*$
$A_{q_0} = (a \cup b (a b^* a)^* b)^* b (a b^* a)^*$

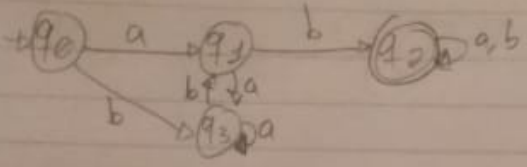
j)



$A_{q_0} = a A_{q_2} \cup b A_{q_2}$
$A_{q_1} = a A_{q_2} \cup b A_{q_2}$
$A_{q_2} = a A_{q_1} \cup b A_{q_0} \cup \varepsilon$

$A_{q_0} = A_{q_1}$
$A_{q_0} = (a \cup b) A_{q_2}$
$A_{q_1} = (a \cup b) A_{q_2}$
$A_{q_2} = a (a \cup b) A_{q_2} \cup b (a \cup b) A_{q_2} \cup \varepsilon$
$A_{q_2} = (a (a \cup b) \cup b (a \cup b)) A_{q_2} \cup \varepsilon$
$A_{q_2} = (a \cup b)(a \cup b) A_{q_2} \cup \varepsilon$
$A_{q_2} = (a \cup b)^2 A_{q_2} \cup \varepsilon$
$A_{q_2} = (a \cup b)^{2*}$

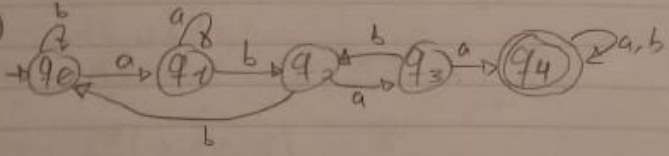
k)



$A_0 = aA_1 \cup bA_3$
$A_1 = aA_2 \cup bA_2$
$A_2 = aA_2 \cup bA_2 \cup \varepsilon$
$A_3 = aA_3 \cup bA_1$

$A_3 = a^*bA_1$
$A_1 = aa^*bA_1 \cup bA_2$
$A_1 = (aa^*b)^*bA_2$
$A_2 = (a \cup b)^*A_2 \cup \varepsilon$
$A_2 = (a \cup b)^*$
$A_1 = (aa^*b)^*b(a \cup b)^*$
$A_3 = a^*b(aa^*b)^*b(a \cup b)^*$
$A_0 = a(aa^*b)^*b(a \cup b)^* \cup ba^*b(aa^*b)^*b(a \cup b)^*$

l)



$A_0 = aA_1 \cup bA_0$
$A_1 = aA_1 \cup bA_2$
$A_2 = aA_3 \cup bA_0$
$A_3 = aA_4 \cup bA_2$
$A_4 = aA_4 \cup bA_4 \cup \varepsilon$

$A_4 = (a \cup b)A_4 \cup \varepsilon$
$A_4 = (a \cup b)^*$
$A_3 = a(a \cup b)^* \cup bA_2$
$A_2 = aa(a(a \cup b)^* \cup bA_2) \cup bA_0$
$A_2 = aaa(a \cup b)^* \cup aabA_2 \cup bA_0$
$A_2 = (aab)^*(aaa(a \cup b)^* \cup bA_0)$
$A_1 = aA_1 \cup b(aab)^*(aaa(a \cup b)^* \cup bA_0)$
$A_1 = aA_1 \cup b(aab)^*aaa(a \cup b)^* \cup b(aab)^*bA_0$

$A_1 = a^*(b(aab)^*aaa(a \cup b)^* \cup b(aab)^*bA_0$

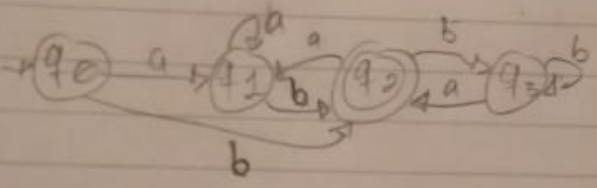
$A_e = a a^* (b (aab)^* aaa (a \cup b)^* \cup b (aab)^* b A_e) \cup b A_e$

$A_e = a a^* b (aab)^* aaa (a \cup b)^* \cup a a^* b (aab)^* b A_e \cup b A_e$

$A_e = (b \cup a a^* b (aab)^* b) A_e \cup a a^* b (aab)^* aaa (a \cup b)^*$

$A_e = (b \cup a a^* b (aab)^* b)^* a a^* b (aab)^* aaa (a \cup b)^*$

m)



$A_e = a A_1 \cup b A_2$

$A_1 = a A_1 \cup b A_2$

$A_2 = a A_1 \cup b A_2 \cup \varepsilon$

$A_2 = a A_2 \cup b A_3$

$A_3 = b^* a A_2$

$A_2 = a A_1 \cup b b^* a A_2 \cup \varepsilon$

$A_2 = (b b^* a)^* (a A_1 \cup \varepsilon)$

$A_1 = a A_1 \cup b (b b^* a)^* (a A_1 \cup \varepsilon)$

$A_1 = a A_1 \cup b (b b^* a)^* a A_1 \cup b (b b^* a)^*$

$A_1 = (a \cup b (b b^* a)^* a) A_1 \cup b (b b^* a)^*$

$A_1 = (a \cup b (b b^* a)^* a)^* b (b b^* a)^*$

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

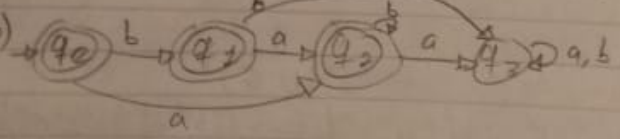
$A_e = (a \cup b (b b^* a)^* a)^* b (b b^* a)^* \cup b ((b b^* a)^* (a (a \cup b (b b^* a)^* b (b b^* a)^*) \cup \varepsilon)$

η)

$A_0 = aA_1 \cup bA_2$
$A_1 = aA_2 \cup bA_1$
$A_2 = aA_1 \cup bA_3 \cup \varepsilon$
$A_3 = aA_3 \cup bA_3$

$A_3 = (a \cup b)A_3$
$A_3 = \emptyset$
$A_2 = aA_1 \cup \varepsilon$
$A_1 = a(aA_1 \cup \varepsilon) \cup bA_1$
$A_1 = aaA_1 \cup a \cup bA_1$
$A_1 = (aa \cup b)A_1 \cup a$
$A_1 = (aa \cup b)^* a$
$A_2 = a(aa \cup b)^* a \cup \varepsilon$
$A_0 = a(aa \cup b)^* a \cup b((aa \cup b)^* a \cup \varepsilon)$
$A_0 = a(aa \cup b)^* a \cup b(aa \cup b)^* b$

ο)



$A_0 = aA_2 \cup bA_1 \cup \varepsilon$
$A_1 = aA_2 \cup bA_3 \cup \varepsilon$
$A_2 = aA_3 \cup bA_2 \cup \varepsilon$
$A_3 = aA_3 \cup bA_3$

$A_3 = (a \cup b)A_3$
$A_3 = \emptyset$
$A_2 = bA_2 \cup \varepsilon$
$A_2 = b^*$
$A_1 = ab^* \cup \varepsilon$
$A_0 = ab^* \cup b(ab^* \cup \varepsilon) \cup \varepsilon$
$A_0 = ab^* \cup bab^* \cup b \cup \varepsilon$