Tarea 17

1: Encuentre la expresión regular que genera cada una de las siguientes gramáticas regulares

a) $S \to bA \mid aB \mid baB$
$A \to bS \mid b$
$B \to aA$

regex = $(bb \cup aab \cup baab)^+$

b) $S \to aA \mid bB$
$A \to bS \mid b$
$B \to a$

regex = $(ab)^+ \cup ba$

c) $S \to A \mid bS$
$A \to bB \mid bC$
$B \to aC$
$C \to a$

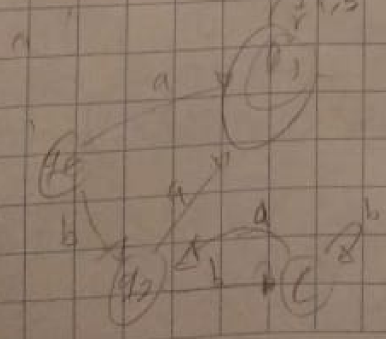
regex = $b^*(baa \cup ba)$

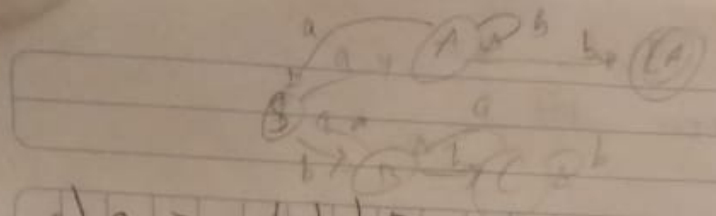
d) $S \to aA \mid bB$
$A \to aA \mid bA \mid \varepsilon$
$B \to aA \mid bC$
$C \to aB \mid bC$

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

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

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





e) $S \to aA \mid bB$
$A \to bA \mid aS \mid b$
$B \to aS \mid bC$
$C \to aB \mid bC$

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

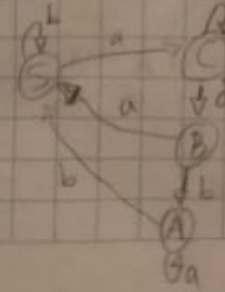
f) $S \to aA \mid bC$
$A \to aA \mid bB$
$B \to aB \mid bB \mid b$
$C \to aB \mid bA$

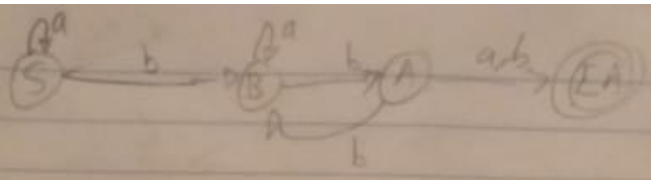
$aa^*b(a \cup b)^*b$

$S = aA \cup bC$
$A = a^*bB$
$B = (b \cup ba^*b)^*b$
$C = aB \mid bA$

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

g) $S \to aC \mid bS$
$A \to aA \mid bS$
$B \to aS \mid bA$
$C \to aB \mid bC \mid b$
regex = $b^*a(b^* \cup a(a \cup ba^*b)b^*a)b$



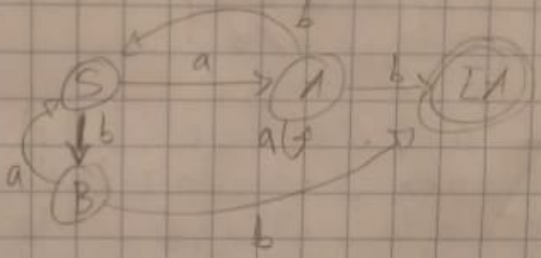


h) $S \to aS \mid bB$
$A \to b \mid aA \mid bB$
$B \to aB \mid bA$

$a^* b (a \cup b^2)^* b \cdot (a \cup b)$

regex = $a^* b (a \cup b^2)^* b (a \cup b)$

i) $S \to aA \mid bB$
$A \to bS \mid aA \mid b$
$B \to aS \mid b$

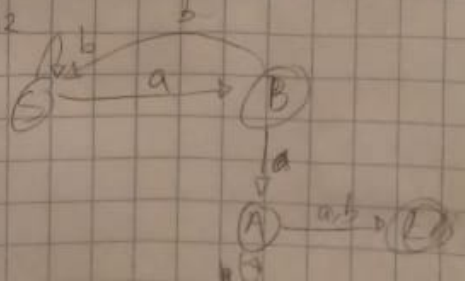


$A_0 = aA_1 \cup bA_2$
$A_1 = aA_0 \cup aA_1 \cup b$
$A_2 = aA_0 \cup b$

$A_1 = a^*(b \cup aA_0)$
$A_0 = aa^*(b \cup aA_0) \cup b(aA_0 \cup b)$
$A_0 = a^+b \cup a^+aA_0 \cup baA_0 \cup b^2$
$A_0 = (a^+a \cup ba)A_0 \cup a^+b \cup b^2$
$A_0 = (a^+a \cup ba)^*(a^+ \cup b)b$ = regex

j) $S \to aB \mid bS$
$A \to a \mid aA \mid b$
$B \to aA \mid bS$

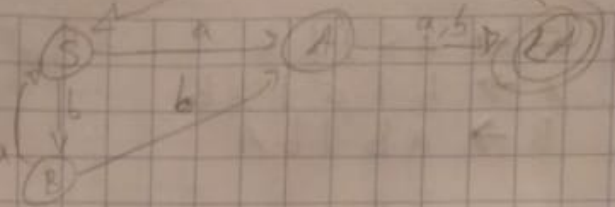
$S = A_0$
$A = A_1$
$B = A_2$



$A_0 = aA_1 \cup bA_0$
$A_1 = a \cup aA_1 \cup b$
$A_2 = aA_1 \cup bA_0$

$A_1 = a^*(a \cup b)$
$A_2 = a^+(a \cup b) \cup bA_0$
$A_0 = a(a^+(a \cup b) \cup bA_0) \cup bA_0$
$A_0 = a^+(a \cup b) \cup abA_0 \cup bA_0$
$A_0 = (ab \cup b)^* a^+(a \cup b) = ((a \cup \varepsilon)b)^* a^+ \cup a^+b)$

k) $S \to aA \mid bB$
$A \to b \mid a \mid bS$
$B \to aS \mid bA$



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

$S = A_0$
$A = A_1$
$B = A_2$

$A_1 = a(\varepsilon \cup bA_e) \cup b(b \cup a \cup bA_e)$
$A_2 = a(\varepsilon \cup bA_e) \cup bb \cup ba \cup b(\varepsilon \cup bA_e)$
$A_2 = aA_e \cup b^2 \cup ba \cup b^2 A_e$
$A_e = a(b \cup a \cup bA_e) \cup b(aA_e \cup b^2 \cup ba \cup b^2 A_e)$
$A_e = ab \cup a^2 \cup abA_e \cup baA_e \cup b^3 \cup b^2 a \cup b^3 A_e$
$A_e = (ab \cup ba \cup b^3)A_e \cup ab \cup a^2 \cup b^3 \cup b^2 a$
$A_e = (ab \cup ba \cup b^3)^* (ab \cup a^2 \cup b^3 \cup b^2 a)$