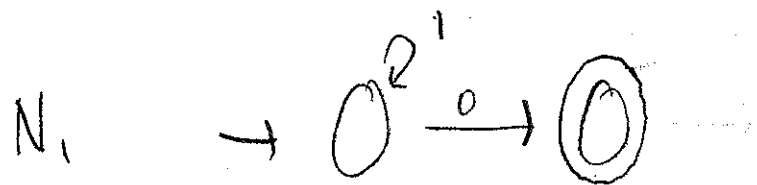
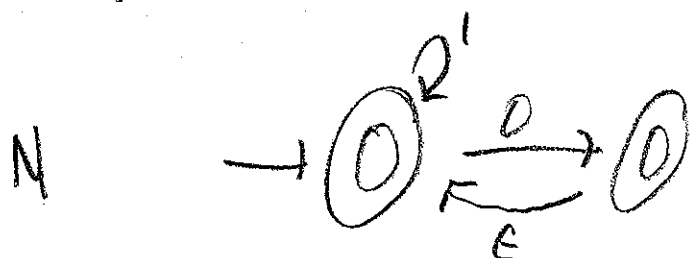


#1 1.15

Consider $A_1 = \{w \mid \Sigma 1^* 0\}$ where $\Sigma = \{0, 1\}$



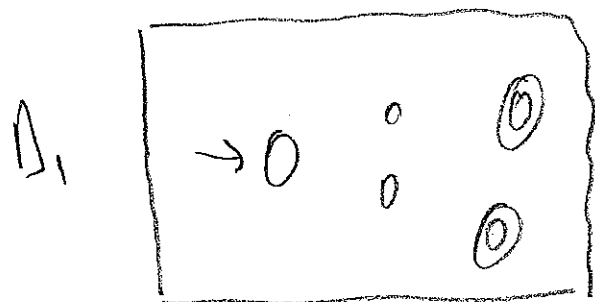
Using the proposed construction



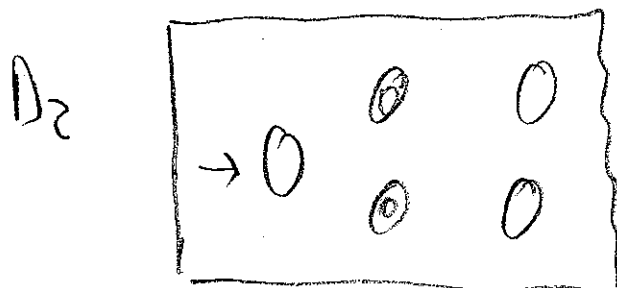
N accepts the string 1 , but $1 \notin (1^*0)^*$

2 points

#2



Construction
of Δ_2 to
recognize
 $\overline{A}$



(note: Δ_2 start state must toggle accept status)

$$\Delta_1 = (Q_1, \Sigma, \delta_1, q_1, F_1)$$

$$\Delta_2 = (Q_2, \Sigma, \delta_2, q_2, F_2)$$

$$Q_2 = Q_1$$

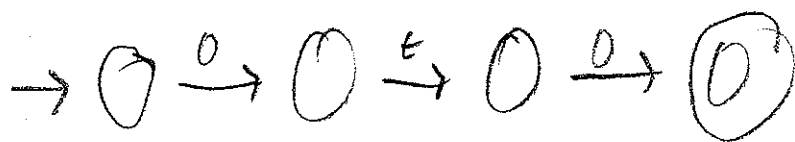
$$\delta_2(q, a) = \delta_1(q, a) \quad q \in Q_1, a \in \Sigma$$

$$q_2 = q_1$$

$$F_2 = \{ q \mid q \in Q_1 \text{ and } q \notin F_1 \}$$

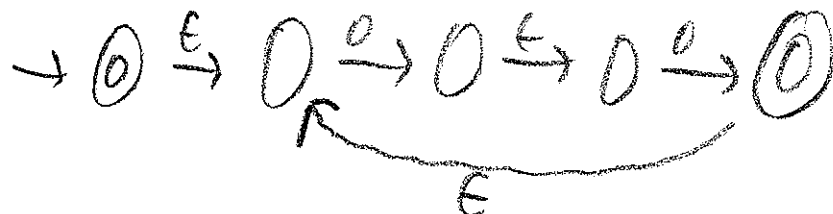
3 points (general idea, 5-tuple specification)

#3

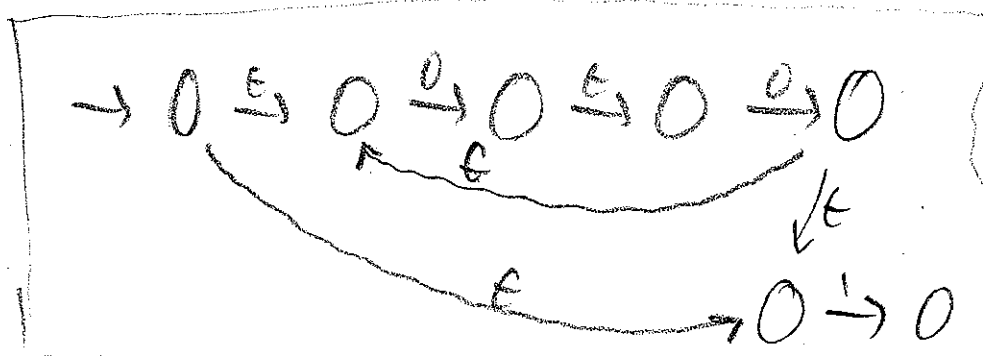


00

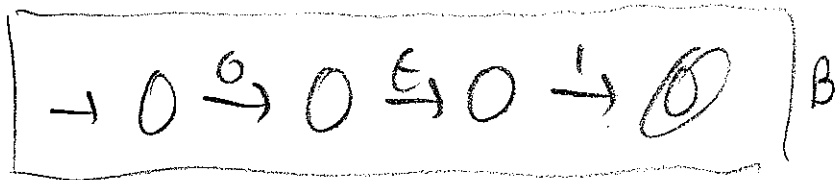
$(00)^*$



$((00)^*(11))$

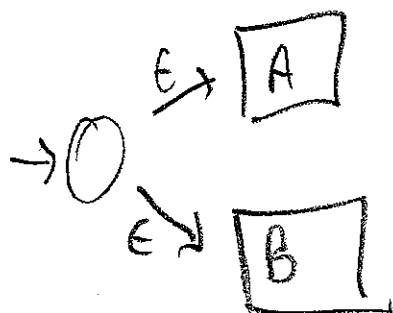


A



01

$((00)^*(11) \cup 01)$



#4 1.20

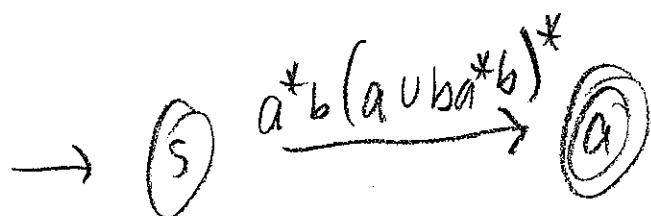
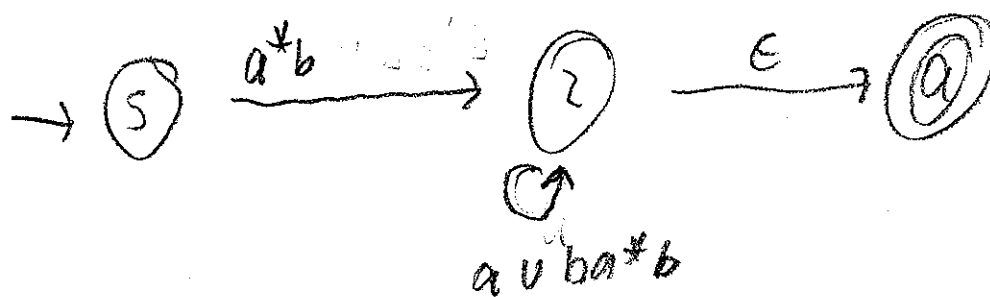
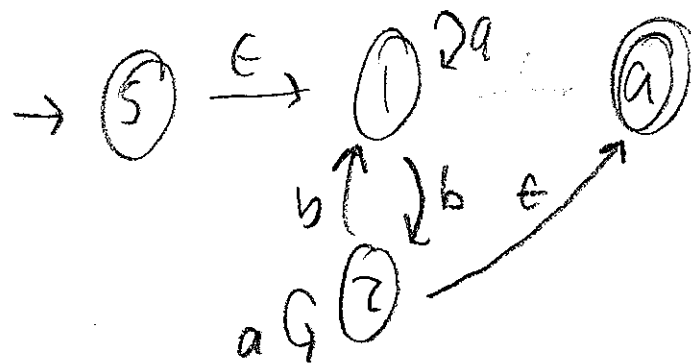
(b) 2 members : $ab, abab$

2 non-members : b, bb

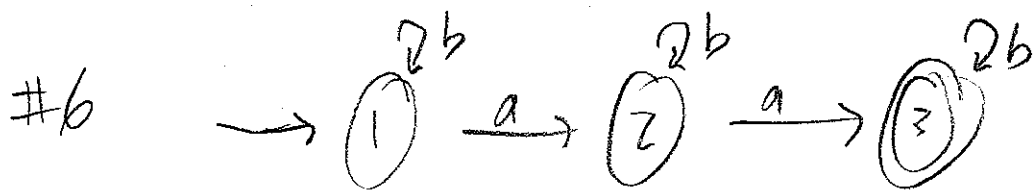
(h) 2 members : a, ba

2 non-members : b, ϵ

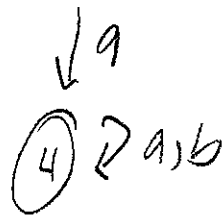
#5 1.21 (a)



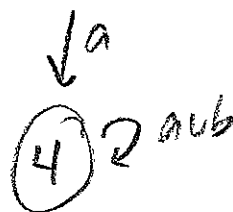
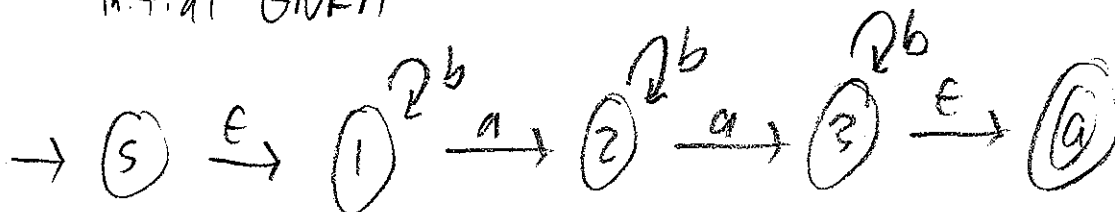
∴ the regular expression
is $a^*b(a \cup ba^*b)^*$



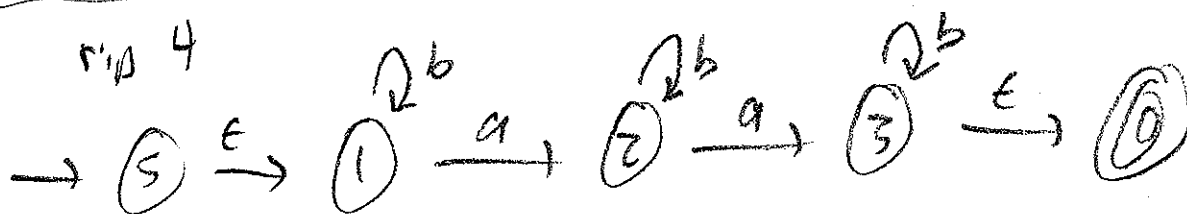
initial DFA



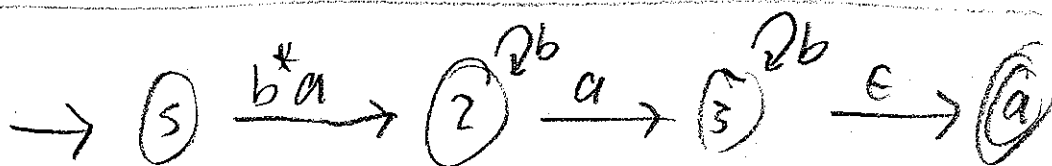
initial GNFA



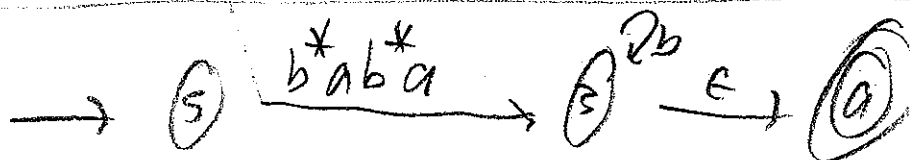
rip 4



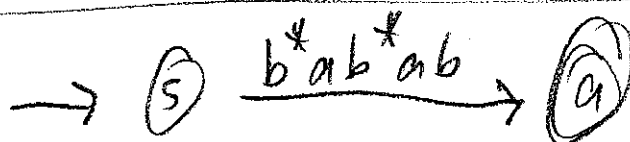
rip 1



rip 2



rip 3



regular expression: $b^*ab^*ab^*$