2.3.5. OPERACIONES

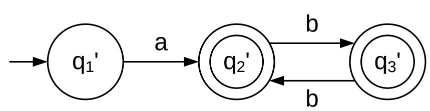
2.3.5.1. UNIÓN

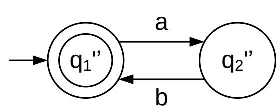
$$\begin{matrix} A_1 = (Q_1, \Sigma_1, \delta_1, q_1, F_1) \\ A_2 = (Q_2, \Sigma_2, \delta_2, q_2, F_2) \end{matrix} \Rightarrow A = (Q, \Sigma, \delta, q_0, F)$$

$$\text{donde} \begin{cases} Q = Q_1 \cup Q_2 \cup \{q_0\} \\ \Sigma = \Sigma_1 \cup \Sigma_2 \\ \delta \begin{cases} \delta(q_0, \varepsilon) = \{q_1, q_2\} \\ \delta(q, \sigma) = \delta_1(q, \sigma) & \forall q \in Q_1, \sigma \in (\Sigma_1 \cup \{\varepsilon\}) \\ \delta(q, \sigma) = \delta_2(q, \sigma) & \forall q \in Q_2, \sigma \in (\Sigma_2 \cup \{\varepsilon\}) \end{cases} \\ F = F_1 \cup F_2 \end{cases}$$

$L(A) = L(A_1) \cup L(A_2)$

Ejemplo:





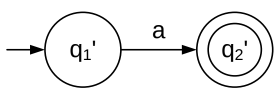
2.3.5.2. CONCATENACIÓN

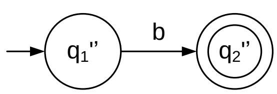
$$\left.\begin{array}{l} A_1 = (Q_1, \Sigma_1, \delta_1, q_1, F_1) \\ A_2 = (Q_2, \Sigma_2, \delta_2, q_2, F_2) \end{array}\right\} \Rightarrow A = (Q, \Sigma, \delta, q_0, F)$$

$$\text{donde} \begin{cases} Q = Q_1 \cup Q_2 \\ \Sigma = \Sigma_1 \cup \Sigma_2 \\ \delta \begin{cases} \delta(q,\sigma) = \delta_1(q,\sigma) & \forall q \in (Q_1 - F_1), \sigma \in (\Sigma_1 \cup \{\varepsilon\}) \\ \delta(q,\sigma) = \delta_1(q,\sigma) & \forall q \in F_1, \sigma \in \Sigma_1 \\ \delta(q,\varepsilon) = \delta_1(q,\varepsilon) \cup \{q_2\} & \forall q \in F_1 \\ \delta(q,\sigma) = \delta_2(q,\sigma) & \forall q \in Q_2, \sigma \in (\Sigma_2 \cup \{\varepsilon\}) \end{cases} \\ q_0 = q_1 \\ F = F_2 \end{cases}$$

$L(A) = L(A_1)L(A_2)$

Ejemplo:





2.3.5.3. CLAUSURA

$$A = (Q, \Sigma, \delta, q_0, F) \quad \Rightarrow \quad A' = (Q', \Sigma, \delta', q_0', F')$$

$$\text{donde} \begin{cases} Q' = Q \cup \{q_0'\} \\ \delta' \begin{cases} \delta'(q_0', \varepsilon) = \{q_0\} & \\ \delta'(q, \sigma) = \delta(q, \sigma) & \forall q \in (Q - F), \sigma \in (\Sigma \cup \{\varepsilon\}) \\ \delta'(q, \sigma) = \delta(q, \sigma) & \forall q \in F, \sigma \in \Sigma \\ \delta'(q, \varepsilon) = \delta(q, \varepsilon) \cup \{q_0'\} & \forall q \in F \end{cases} \\ F' = \{q_0'\} \end{cases}$$

$L(A') = L(A)^*$

2.3.5.4. CLAUSURA POSITIVA

$$A = (Q, \Sigma, \delta, q_0, F) \quad \Rightarrow \quad A' = (Q, \Sigma, \delta', q_0, F)$$

$$\text{donde } \delta' \begin{cases} \delta'(q, \sigma) = \delta(q, \sigma) & \forall q \in (Q - F), \sigma \in (\Sigma \cup \{\varepsilon\}) \\ \delta'(q, \sigma) = \delta(q, \sigma) & \forall q \in F, \sigma \in \Sigma \\ \delta'(q, \varepsilon) = \delta(q, \varepsilon) \cup \{q_0\} & \forall q \in F \end{cases}$$

$L(A') = L(A)^+$