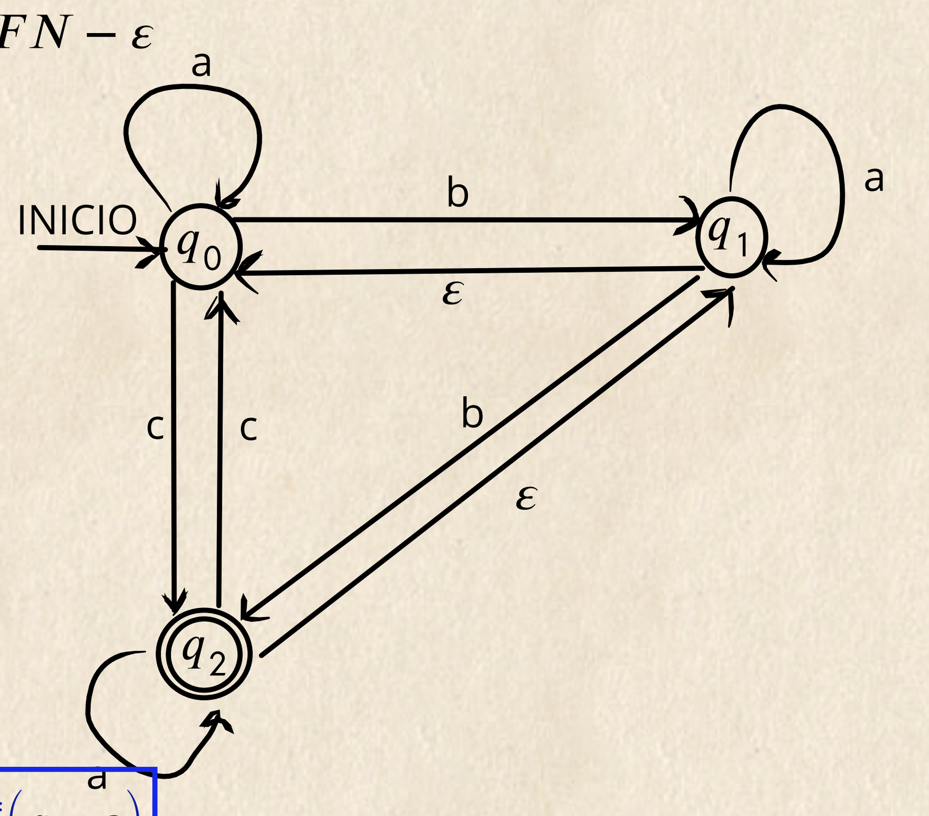
Obtener un AFN sin transiciones ε a partir del siguiente AFN − ε

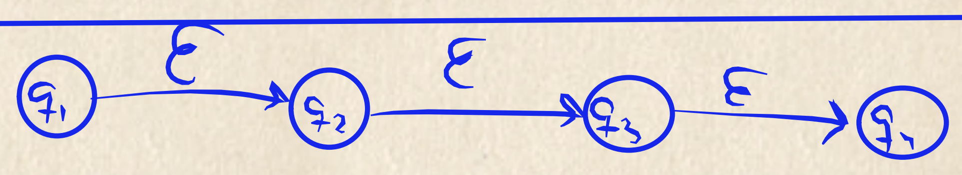
	ε	a	b	c	
q_0	$\varnothing$	$\{q_0\}$	$\{q_1\}$	$\{q_2\}$	0
q_1	$\{q_0\}$	$\{q_1\}$	$\{q_2\}$	$\varnothing$	0
q_2	$\{q_1\}$	$\{q_2\}$	$\varnothing$	$\{q_0\}$	1



$\boxed{\varepsilon - c(q_0) = \{q_0\} = \delta^*(q_0, \varepsilon)}$

$\boxed{\varepsilon - c(q_1) = \{q_0, q_1\} = \delta^*(q_1, \varepsilon)}$ $\boxed{\varepsilon - c(q_2) = \{q_0, q_1, q_2\} = \delta^*(q_2, \varepsilon)}$

$$\delta'(q_2, c) = \delta^*(q_2, c) = \varepsilon - c(\delta(\delta^*(q_2, \varepsilon), c)) = \varepsilon - c(\delta(\{q_0, q_1, q_2\}, c)) = \varepsilon - c(\{q_2\} \cup \varnothing \cup \{q_0\}) = \varepsilon - c(\{q_0, q_2\}) = \varepsilon - c(\{q_0\}) \cup \varepsilon - c(\{q_2\}) = \{q_0\} \cup \{q_0, q_1, q_2\} = \{q_0, q_1, q_2\}$$

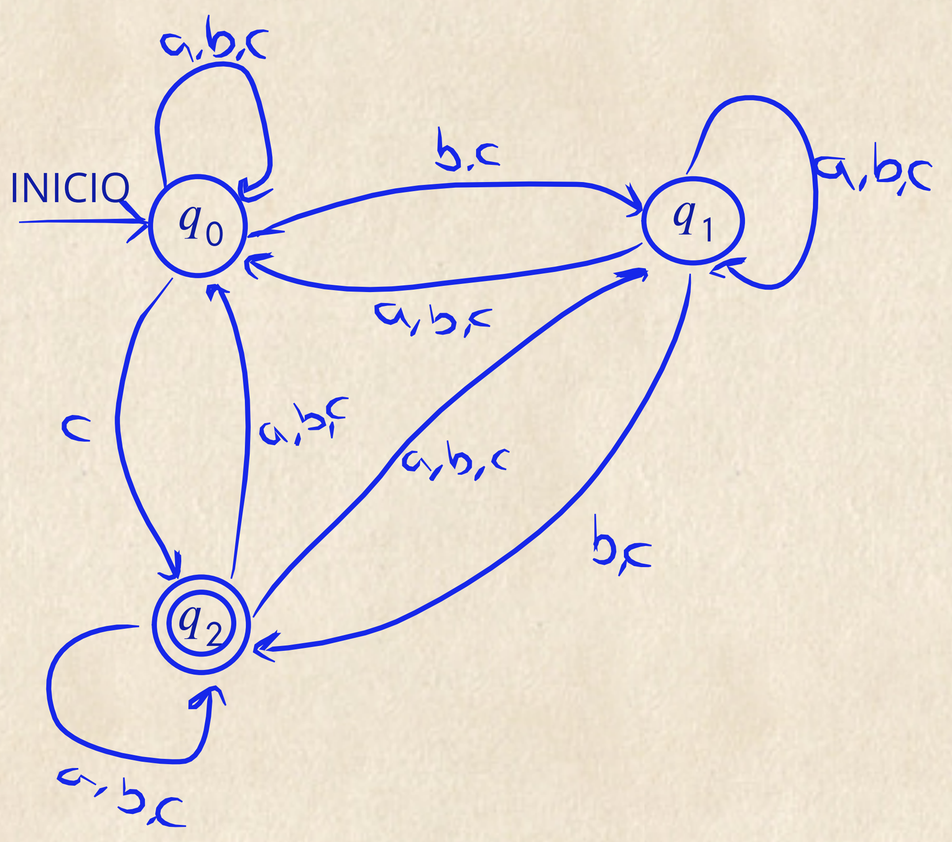


$\varepsilon - c(q_1) = \{q_2, q_1, q_3, q_1\}$

$\varepsilon - c(q_1) : \{q_1, q_3, q_1\}$

$$\boxed{\begin{array}{c} \varepsilon - c(q_0) = \{q_0\} \cap \{q_2\} = \varnothing \\ F' = F = \{q_2\} \end{array}}$$

	a	b	c	
q_0	$\{q_0\}$	$\{q_0, q_1\}$	$\{q_0, q_1, q_2\}$	0
q_1	$\{q_0, q_1\}$	$\{q_0, q_1, q_2\}$	$\{q_0, q_1, q_2\}$	0
q_2	$\{q_0, q_1, q_2\}$	$\{q_0, q_1, q_2\}$	$\{q_0, q_1, q_2\}$	1



EQUIVALENCIA ENTRE AFN − ε Y AFN

TEOREMA. Si L es aceptado por un AFN − ε, entonces L es aceptado por un AFN sin transiciones ε.

Sea $M = (Q, \Sigma, \delta, q_0, F)$ *un AFN − ε. Se construye* $M' = (Q, \Sigma, \delta', q_0, F')$ *como sigue :*

$$F' = \begin{cases} F \cup \{q_0\} \ si\ \varepsilon - c(q_0) \cap F \neq \varnothing \\ F \ en\ otro\ caso \end{cases}$$

$\delta'(q, a) = \delta^*(q, a);\ q \in Q, a \in \Sigma$

$\delta'(q_0, \omega a) = \delta'(\delta'(q_0, \omega), a)$

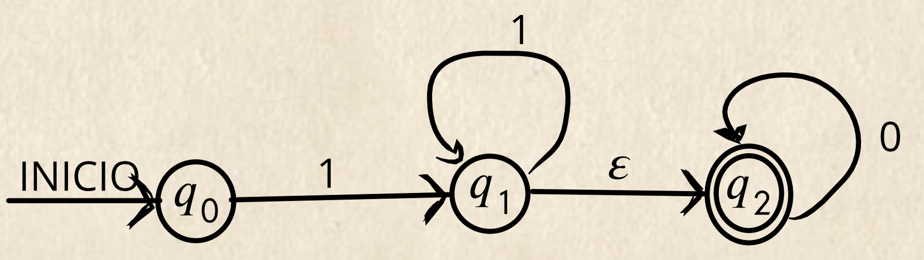
$\delta'(q_0, \omega) = \delta^*(q_0, \omega)$

$\delta'(P, a) = \delta^*(q_0, \omega a)$

$\delta'(P, a) = \cup\, \delta'(q, a) = \cup\, \delta^*(q, a); \quad q \in Q$

$\cup\, \delta^*(q, a) = \delta^*(q_0, \omega a); \quad q \in P$

EJEMPLO: *Convertir el AFN − ε de la imagen, en un AFN sin ε*



Cerradura Epsilon de cada estado

$\varepsilon - c(q_0) = \{q_0\} = \delta^*(q_0, \varepsilon)$

$\varepsilon - c(q_1) = \{q_1, q_2\} = \delta^*(q_1, \varepsilon)$

$\varepsilon - c(q_2) = \{q_2\} = \delta^*(q_2, \varepsilon)$

$Q = \{q_0, q_1, q_2\}$

$\Sigma = \{0, 1\}$

$F = \{q_2\}$

	ENTRADAS			
ESTADOS	0	1	ε	
q_0	$\varnothing$	$\{q_1\}$	$\varnothing$	0
q_1	$\varnothing$	$\{q_1\}$	$\{q_2\}$	0
q_2	$\{q_2\}$	$\varnothing$	$\varnothing$	1

1. Obtener estados finales

$\varepsilon - c(q_0) \cap F = \{q_0\} \cap \{q_2\} = \varnothing$ ← $\boxed{Debido\ a\ que\ es\ \varnothing\ entonces\ F' = F = \{q_2\}}$

2. Obtener la tabla de transiciones

$\delta'(q_i, 0) = \delta^*(q_i, 0)$ *para* $i = 1, 2, 3, \ldots.$

$\delta'(q_i, 1) = \delta^*(q_i, 1)$ *para* $i = 1, 2, 3, \ldots$

$$\delta'(q_0, 0) = \delta^*(q_0, 0) = \varepsilon - c(\delta(\delta^*(q_0, \varepsilon), 0)) = \varepsilon - c(\delta(\{q_0\}, 0)) = \varepsilon - c(\varnothing) = \varnothing$$

$$\delta'(q_0, 1) = \delta^*(q_0, 1) = \varepsilon - c(\delta(\delta^*(q_0, \varepsilon), 1)) = \varepsilon - c(\delta(\{q_0\}, 1)) = \varepsilon - c(\{q_1\}) = \{q_1, q_2\}$$

$$\delta'(q_1, 0) = \delta^*(q_1, 0) = \varepsilon - c(\delta(\delta^*(q_1, \varepsilon), 0)) = \varepsilon - c(\delta(\{q_1, q_2\}, 0)) = \varepsilon - c(\varnothing \cup \{q_2\}) = \varepsilon - c(\{q_2\}) = \{q_2\}$$

$$\delta'(q_1, 1) = \delta^*(q_1, 1) = \varepsilon - c(\delta(\delta^*(q_1, \varepsilon), 1)) = \varepsilon - c(\delta(\{q_1, q_2\}, 1)) = \varepsilon - c(\{q_1\} \cup \varnothing) = \varepsilon - c(\{q_1\}) = \{q_1, q_2\}$$

$$\delta'(q_2, 0) = \delta^*(q_2, 0) = \varepsilon - c(\delta(\delta^*(q_2, \varepsilon), 0)) = \varepsilon - c(\delta(\{q_2\}, 0)) = \varepsilon - c(\{q_2\}) = \{q_2\}$$

$$\delta'(q_2, 1) = \delta^*(q_2, 1) = \varepsilon - c(\delta(\delta^*(q_2, \varepsilon), 1)) = \varepsilon - c(\delta(\{q_2\}, 1)) = \varepsilon - c(\varnothing) = \varnothing$$

δ' :

	ENTRADAS	
ESTADOS	0	1
q_0	$\varnothing$	$\{q_1, q_2\}$
q_1	$\{q_2\}$	$\{q_1, q_2\}$
q_2	$\{q_2\}$	$\varnothing$