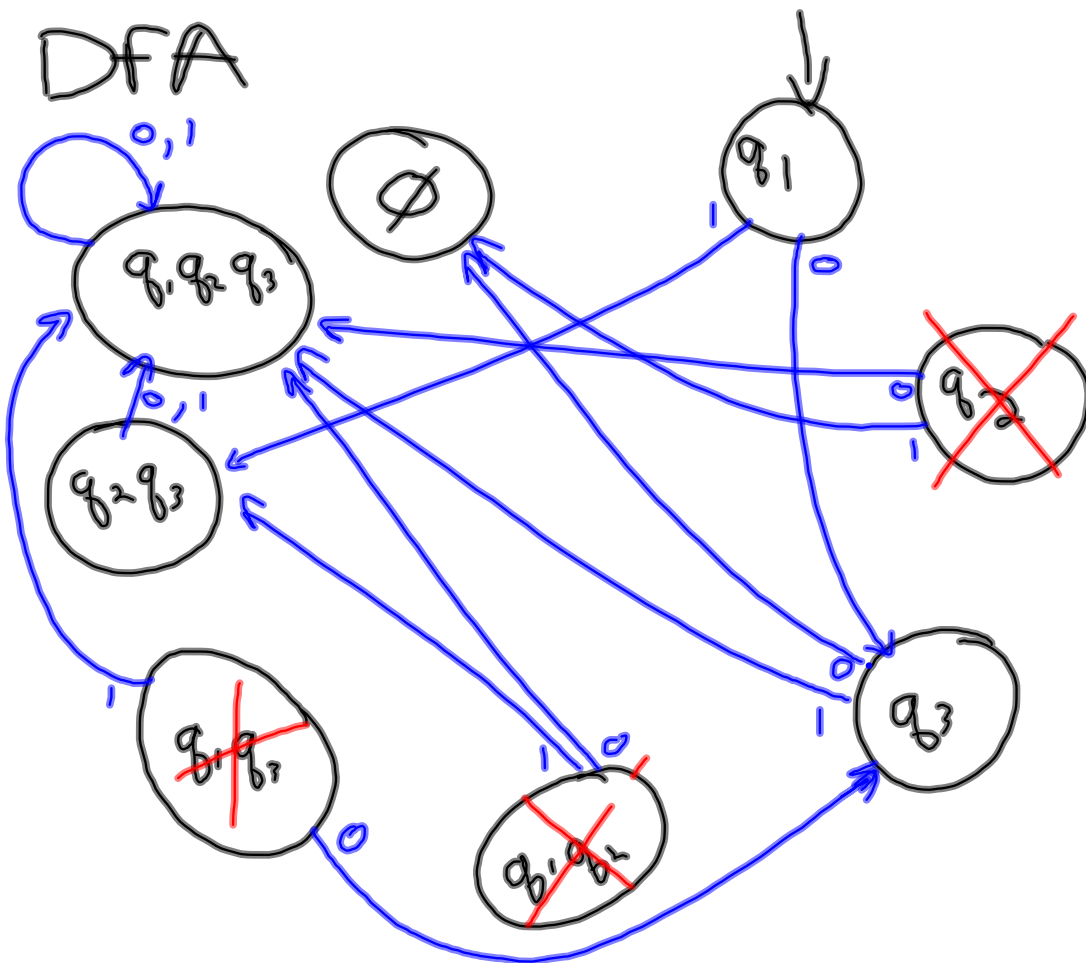


δ	0	1	ϵ
q_1	q_3	q_2	\emptyset
q_2	$\{q_1, q_3\}$	\emptyset	q_3
q_3	\emptyset	$\{q_1, q_2\}$	\emptyset

DFA

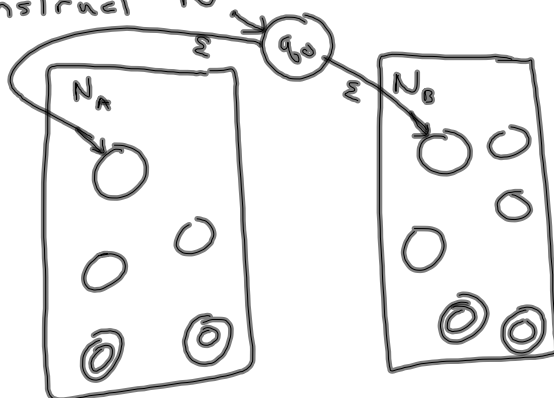


Regular languages are closed under \cup .

Suppose A, B are reg. lang
Show $A \cup B$ is regular

N_A, N_B are NFA's recognizing A, B

Construct N for $A \cup B$



$$N_A = (Q_A, \Sigma, \delta_A, q_A, F_A)$$

$$N_B = (Q_B, \Sigma, \delta_B, q_B, F_B)$$

construct $N = (Q, \Sigma, \delta, q_0, F)$

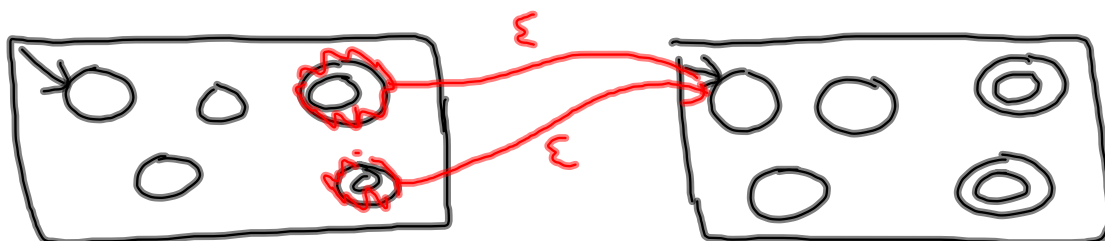
$$Q = Q_A \cup Q_B \cup \{q_0\}$$

$$\Sigma = \Sigma$$

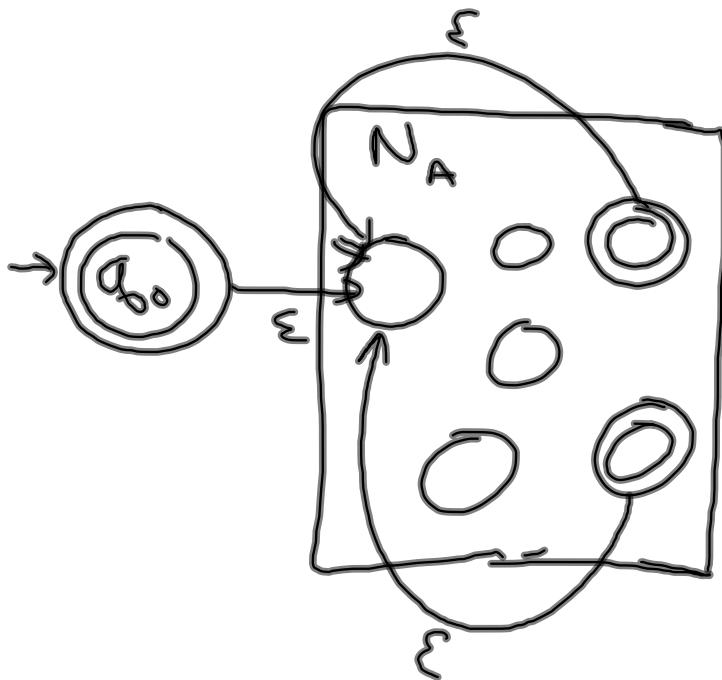
δ :

$$\delta(q, a) = \begin{cases} \delta_A(q, a) & q \in Q_A \\ \delta_B(q, a) & q \in Q_B \\ \{q_A, q_B\} & q = q_0, a \in \Sigma \\ \emptyset & q = q_0, a \notin \Sigma \end{cases}$$

Regular Lang. closed under concatenation
 A, B $A \circ B$



*



$$L = \{a, bc\}$$

$$L^* = \{ \epsilon, a, bc, aa, abc, bca, bc bc, \dots \}$$

$$L_1 = \{ \epsilon \}$$

$$L_2 = \{ w \mid w \text{ has an even \# of 1's} \}$$

$$L_2 \circ (L_1^*)$$

