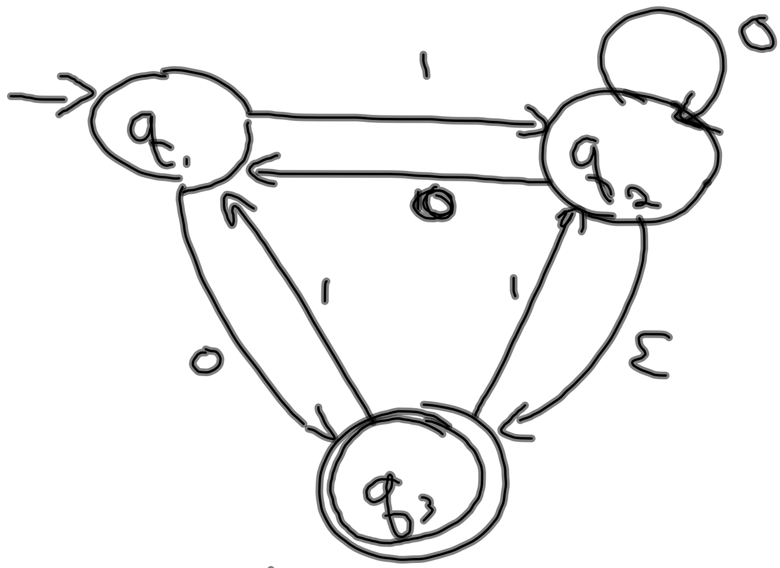
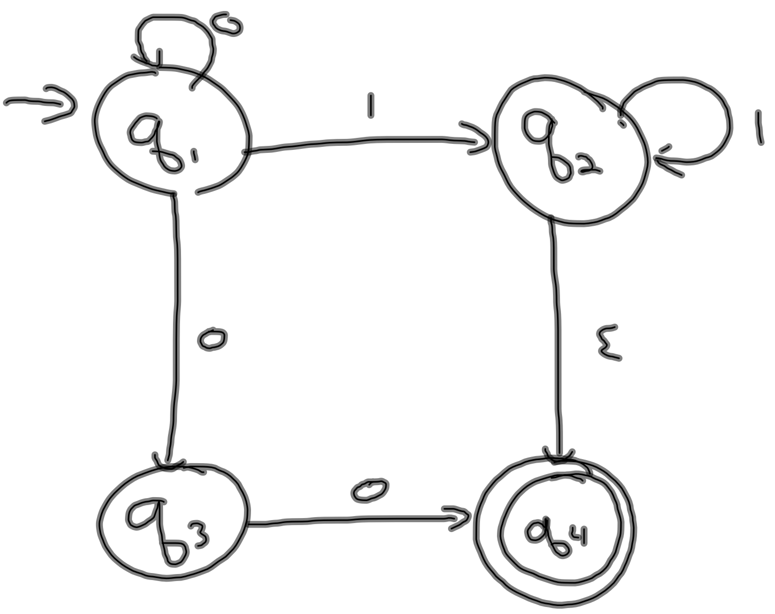


ε - no input

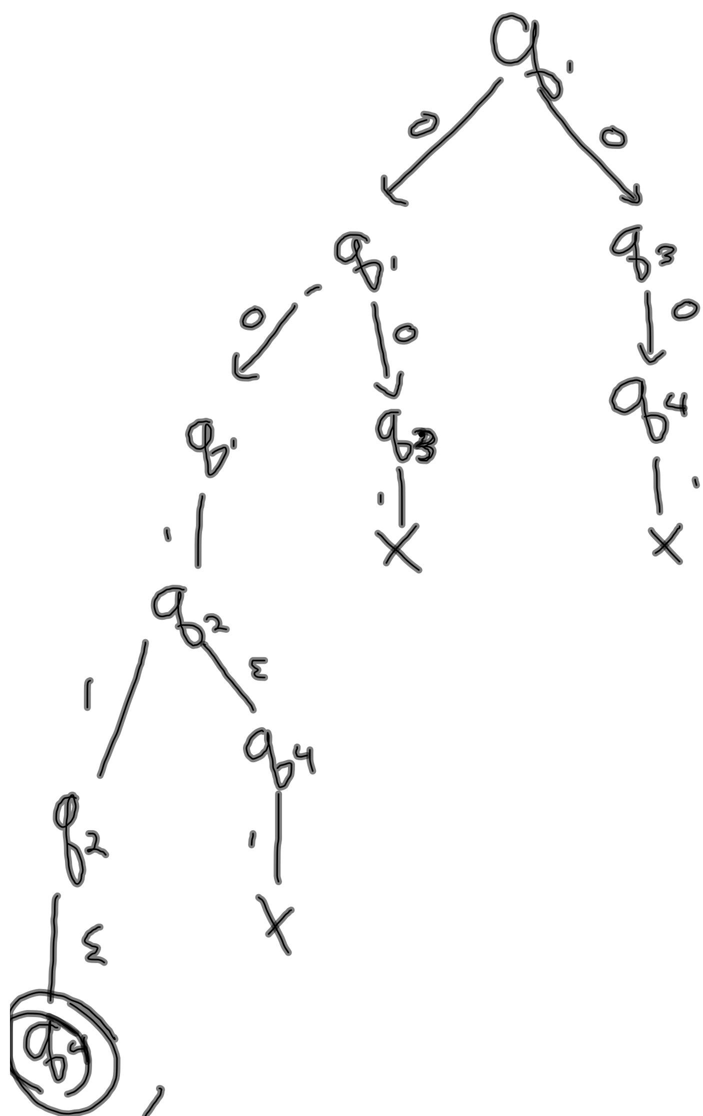
q_3 on 1 to $\{q_1, q_2\}$

q_2 on 0 to $\{q_1, q_2\}$

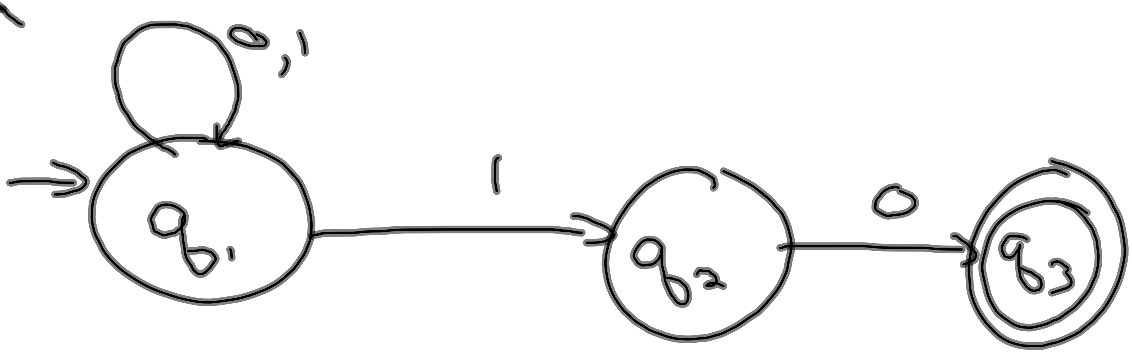
q_3 on 0 ?



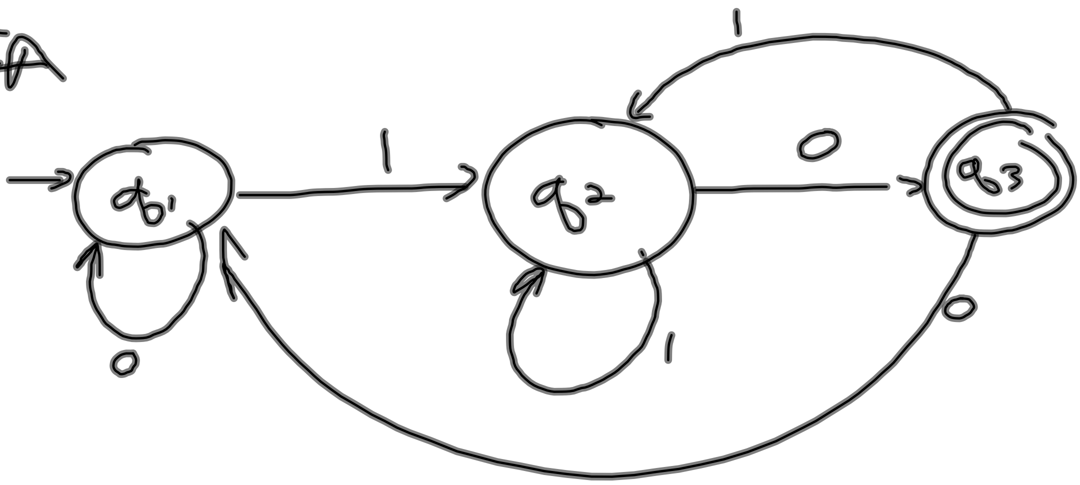
input: 0011

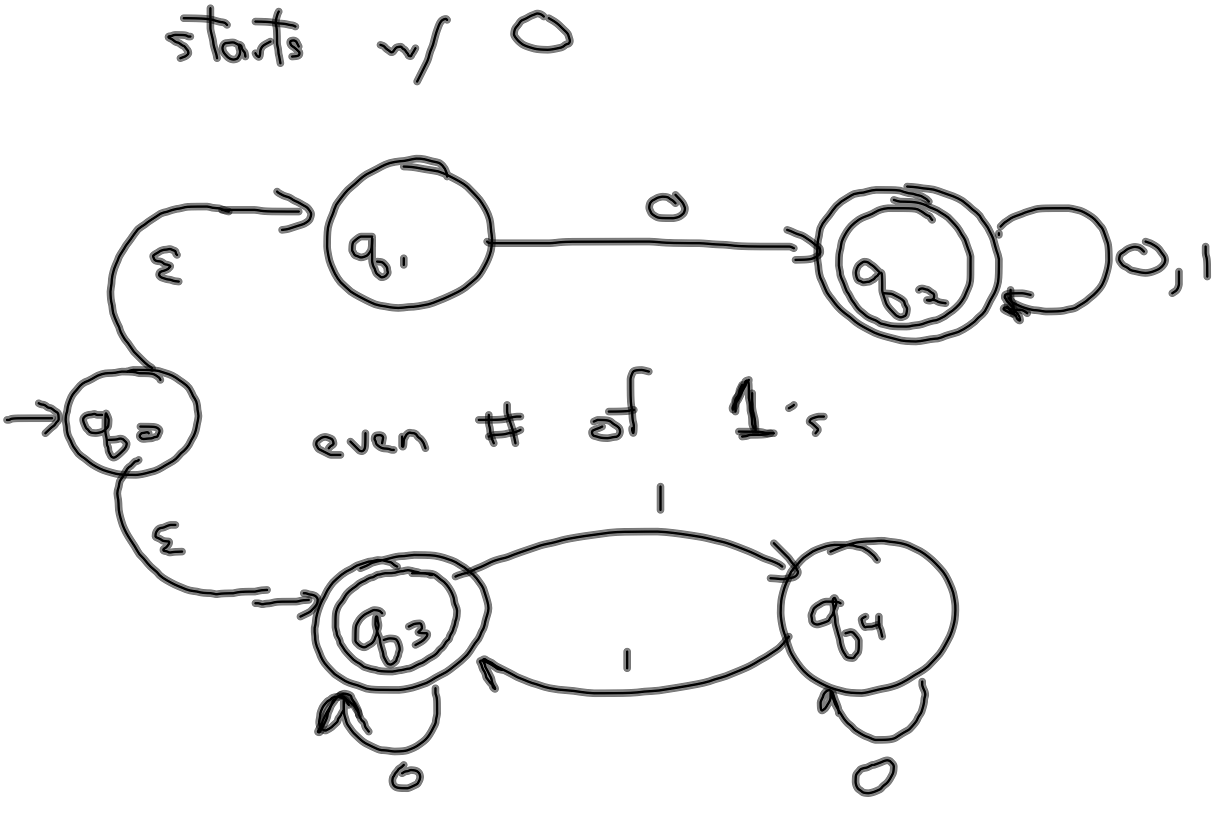


NFA



DFA




starts w/ 0
ε
q1
0
q2
0, 1
q0
even # of 1's
ε
1
q3
1
q4
0
0

NFA: $(Q, \Sigma, \delta, q_0, F)$

1. Q : set of states
2. Σ : alphabet
4. $q_0 \in Q$
5. $F \subseteq Q$
3. $\delta : Q \times \Sigma_\varepsilon \longrightarrow \mathcal{P}(Q)$

$$\Sigma_\varepsilon = \Sigma \cup \{\varepsilon\}$$

Every NFA has an equiv. DFA

Let $N = (Q, \Sigma, \delta, q_0, F)$ be an NFA recognizing some language A.

Construct DFA $M = (Q', \Sigma, \delta', q_0', F')$

consider N w/ no ε-transitions

1. $Q' = \mathcal{P}(Q)$
2. Σ
4. $q_0' = \{q_0\}$
5. $F' = \{R \in Q' \mid R$ contains an accepting state of $N\}$
3. δ' for $R \in Q'$ and $a \in \Sigma$

$$\delta'(R, a) = \{q \in Q \mid q \in \delta(r, a) \text{ for some } r \in R\}$$

ε-Transitions

$E(R) = \{ q \mid q$ can be reached from R by following any number of ε-trans$\}$

3. $\delta'(R, a) = \{ q \in Q \mid q \in E(\delta(r, a))$ for some $r \in R \}$

4. $q_0' = \{ E(q_0) \}$