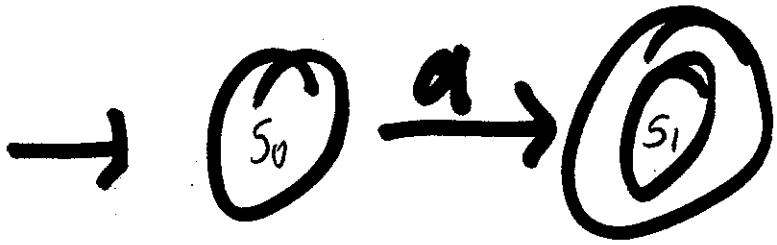
$\{\varepsilon\}$ $\{\} \equiv \emptyset$



N

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

$Q = \{s_0, s_1\}$

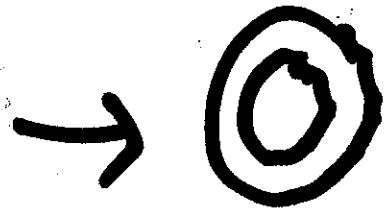
$\Sigma = \{a, b, \ldots\}$

$q_0 = s_0$

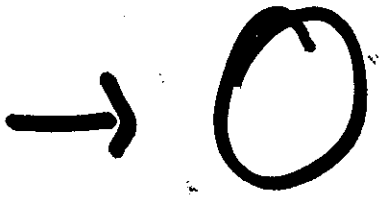
$F = \{s_1\}$

$$\delta(q, x) = \begin{cases} s_1 \text{ if } q = s_0 \text{ and } x = a \\ \emptyset \text{ otherwise} \end{cases}$$

NFA for ϵ



NFA for $\emptyset$



Regular expression

$$(0 \cup 11)^* 1$$

$\{w \mid w$ contains a single one$\}$

0^*10^*

$\{w \mid w$ has even length$\}$

$(\Sigma\Sigma)^*$

$\{w \mid$ every 0 is followed by at least

almost $1^*(01)^*1^*$ $1^*(01^+)^*$

01101 ✓ 11101

Convert $(01)^* \cup 1$ to an NFA