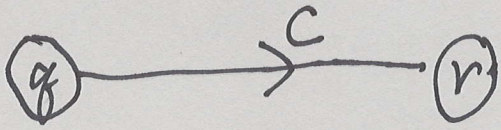
Three forms of δ for a Defn FA

$$\delta : \overbrace{Q \times \Sigma}^{A} \longrightarrow \overbrace{Q}^{B}$$ defined schematically,

by $\delta(q, c) = r$

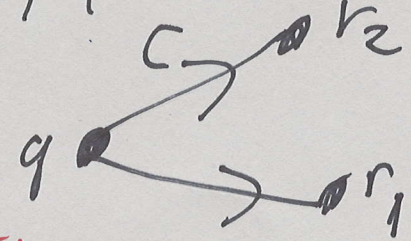


1. State delta(State q, char c);
2. State (*delta)(State q, char c);
3. Set<Triple<State, char State>> delta;

The FA is deterministic (a DFA) if form 3 defines a function, i.e., if $(\forall q \in Q)(\forall c \in \Sigma)(\exists! r \in Q) : (q, c, r) \in \delta$.

Otherwise, the FA is nondeterministic (an NFA).

Informal Defn: An NFA N has nondeterminism at state q on char c if there are $r_1 \neq r_2$ such that $(q, c, r_1) \in \delta \wedge (q, c, r_2) \in \delta$



One more Wrinkle: We can let NFAs have arcs on ε too
empty string.