Week2 friday

Nondeterministic finite automaton $M = (Q, \Sigma, \delta, q_0, F)$

Finite set of states Q Can be labelled by any collection of distinct names. Default: $q0, q1, \ldots$

Alphabet Σ Each input to the automaton is a string over Σ .

Arrow labels Σ_{ε} $\Sigma_{\varepsilon} = \Sigma \cup \{\varepsilon\}.$

Arrows in the state diagram are labelled either by symbols from Σ or by ε

Transition function δ $\delta: Q \times \Sigma_{\varepsilon} \to \mathcal{P}(Q)$ gives the **set of possible next states** for a transition

from the current state upon reading a symbol or spontaneously moving.

Start state q_0 Element of Q. Each computation of the machine starts at the start state.

Accept (final) states $F F \subseteq Q$.

M accepts the input string if and only if **there is** a computation of M on the input string

that processes the whole string and ends in an accept state.

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The formal definition of the NFA over $\{0,1\}$ given by this state diagram is:



The language over $\{0,1\}$ recognized by this NFA is:

Change the transition function to get a different NFA which accepts the empty string.

The state diagram of an NFA over $\{a,b\}$ is below. The formal definition of this NFA is:



The language recognized by this NFA is: