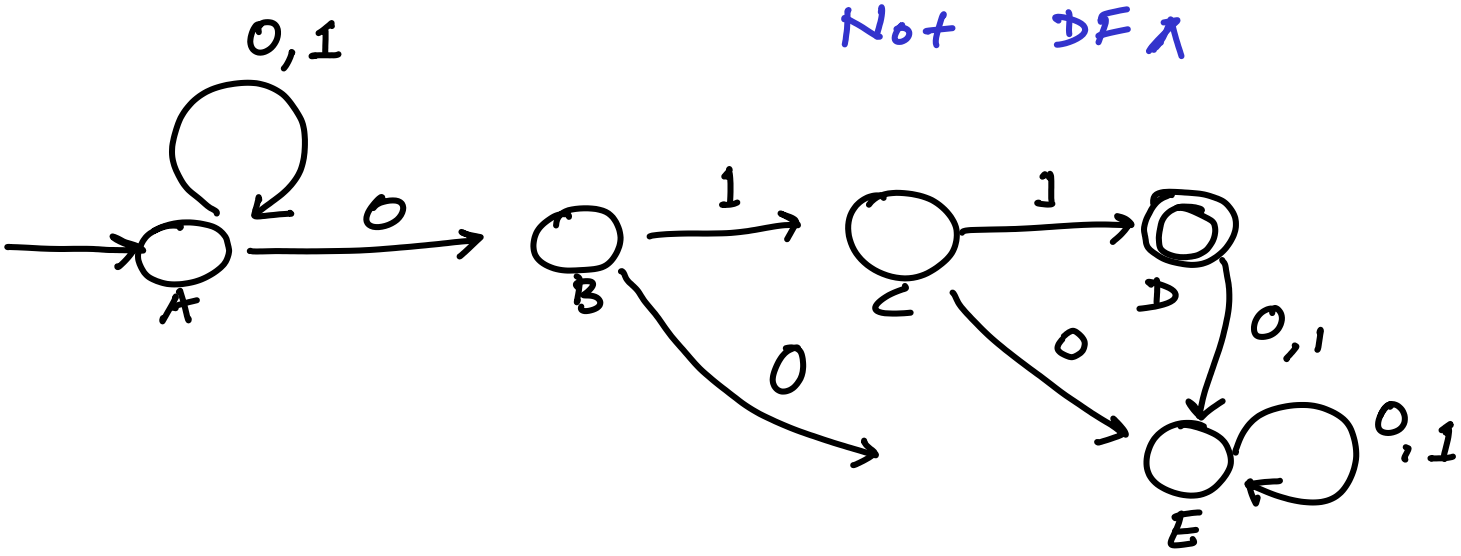
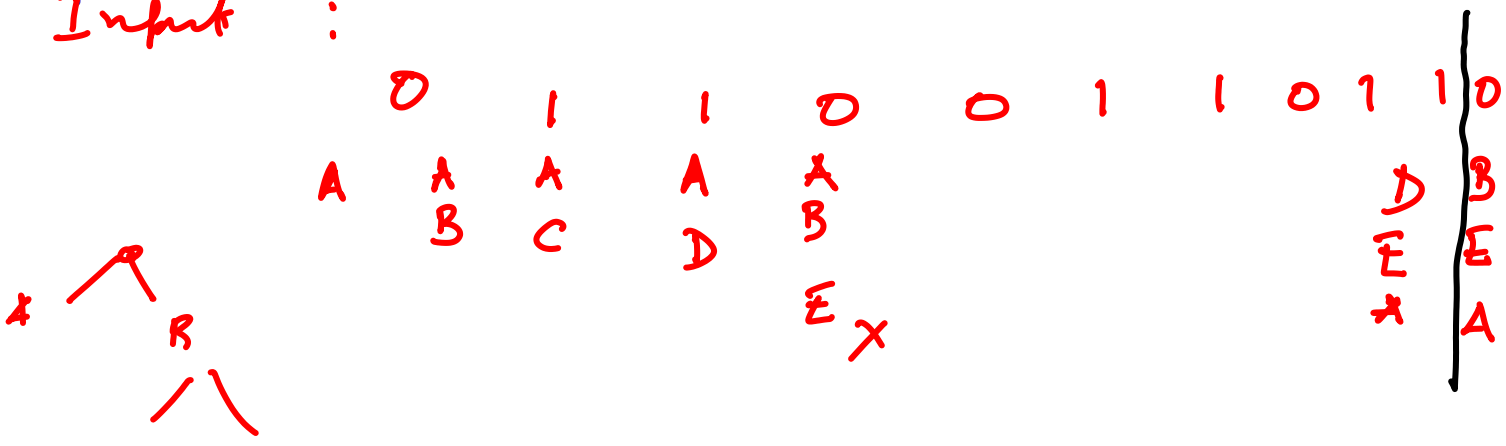
COL 352 Lecture 7 Jan 16



Not DFA

For state A, on input 0 the machine arbitrary "chooses" one of the possible transitions i.e. state A or state B

Input :



A string w is accepted iff one of the possible terminating states is a Final state

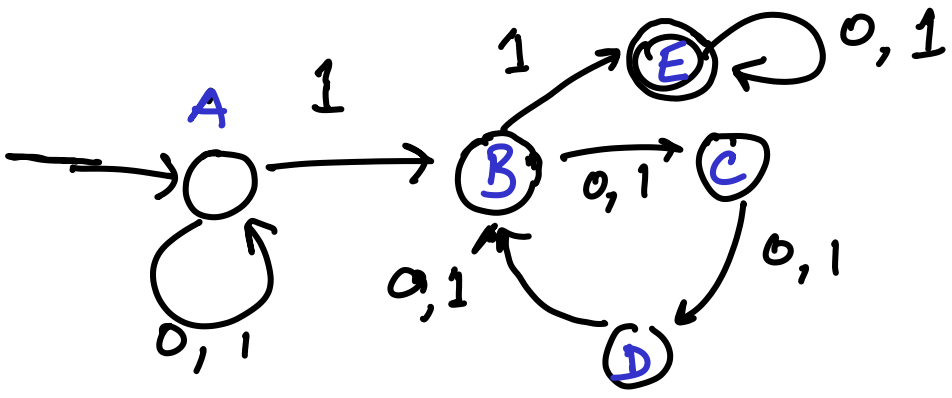
The above automaton accepts $w \in \Sigma^*$, iff w ends with 011

This automaton that can have multiple transitions is known as Non deterministic Finite Automaton (NFA)

Design an NFA that accepts the language $w \in \Sigma^*$, such that some pair of 1's is separated by $3i$ symbols, $i \geq 0$

0 0 1 1 0 1 0 0 1 1 ✓

0 1 0 1 0 0 X



NFA N:

Q: set of states

$F \subseteq Q$ set of final states

$q_0 \in Q$: initial state

$\delta : Q \times \Sigma \to 2^Q - \phi$ (multiple successor states)

$$L(N) = \{ \omega \mid \hat{\delta}(q_0, \omega) \cap F \neq \phi \}$$

$$\hat{\delta}(\{q\}, a) = \delta(q, a) \qquad q \in Q,\ a \in \Sigma$$

$$\hat{\delta}(P, a) = \bigcup_{q \in P} \hat{\delta}(q, a) \qquad P \subseteq Q$$

$$\hat{\delta}(P, a\omega) = \hat{\delta}(\hat{\delta}(P, a), \omega) \qquad a \in \Sigma,\ \omega \in \Sigma^*$$