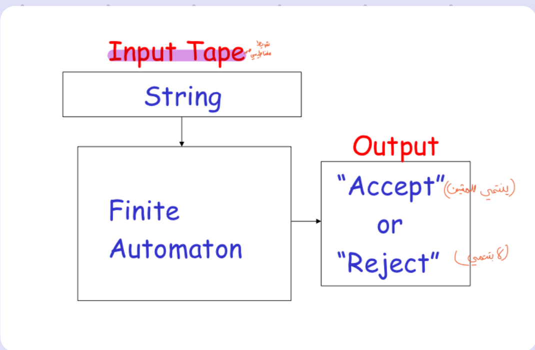
DFA → Deterministic finite automata

- كل نود بنسميه ← state
- كل ايدج بنسميه ← transation

لكل state عندي transition لكل سامبل بالألفابت



To accept a string:

لازم كل الشرطين

all the input string is scanned
and the last state is accepting

اذا الستارت ستيت هي نفسها الأكسبت ستيت ف λ ضمن ال accepted language

To reject a string:

all the input string is scanned
and the last state is non-accepting

Formal Definition $M = (Q, \Sigma, \delta, q_0, F)$

Q	:	set of States
Σ	:	input alphabet — $\lambda \notin \Sigma$ ($\lambda \notin \Sigma$: the input alphabet never contains λ)
δ	:	transition function — (state, input) → new state; one-to-one in DFA
q_0	:	initial state
F	:	set of accepting states

$\delta^* : Q \times \Sigma^* \to Q$ — تصير على string يعني بدل ما أمشي على one state بأمشي على أكثر من state

$\delta^*(q, \lambda) = q$

عشان نقبل string فأحط معها δ

Language by M

accepted

$L(M) = \{ w \in \Sigma^* : \delta^*(q_0, w) \in F \}$

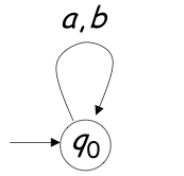
(q_0: initial state, w: word (string), F: accepting state)

rejected

$L(M) = \{ w \in \Sigma^* : \delta^*(q_0, w) \notin F \}$

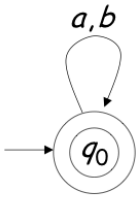
(النتيجة لا تنتمي لل accepting state)

More DFA Examples



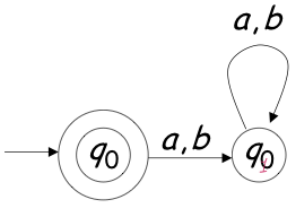
$L(M) = \{\ \}$

Empty language



$L(M) = \Sigma^*$

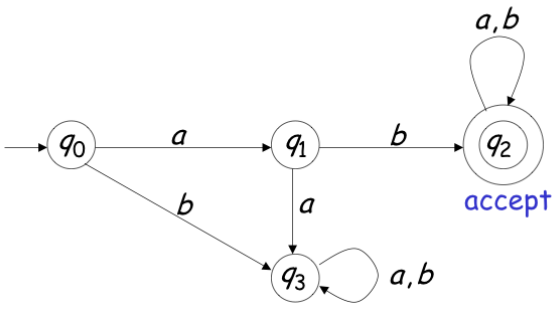
All strings



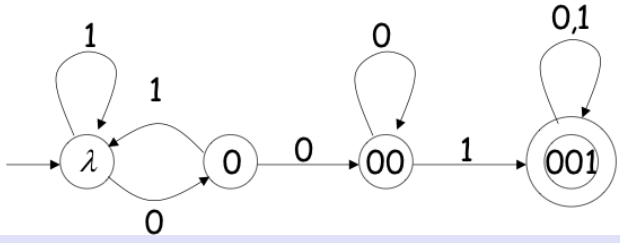
$L(M) = \{\lambda\}$

Language of the empty string

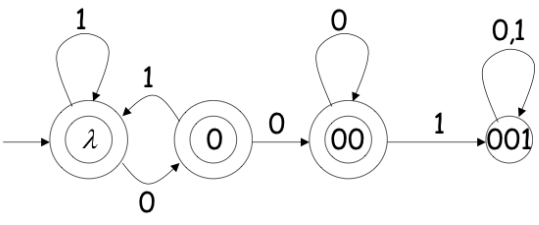
$L(M)$ = { all strings with prefix ab }



$L(M)$ = { all binary strings containing substring 001 }



$L(M)$ = { all binary strings without substring 001 }



$L(M) = \{awa : w \in \{a,b\}^*\}$