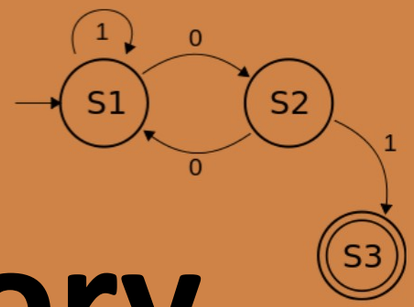
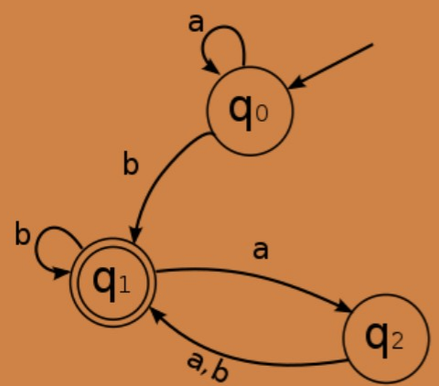
Theory of Automata





Dastgir Sabri

Deterministic FINITE AUTOMATA (DFA)

- What is it?
- How to draw DFA?

Programology

Deterministic Finite Automata - What is DFA and how to draw DFA?

- ✓ **It's an other method for defining languages**
- ✓ **It's a Graphical Method**

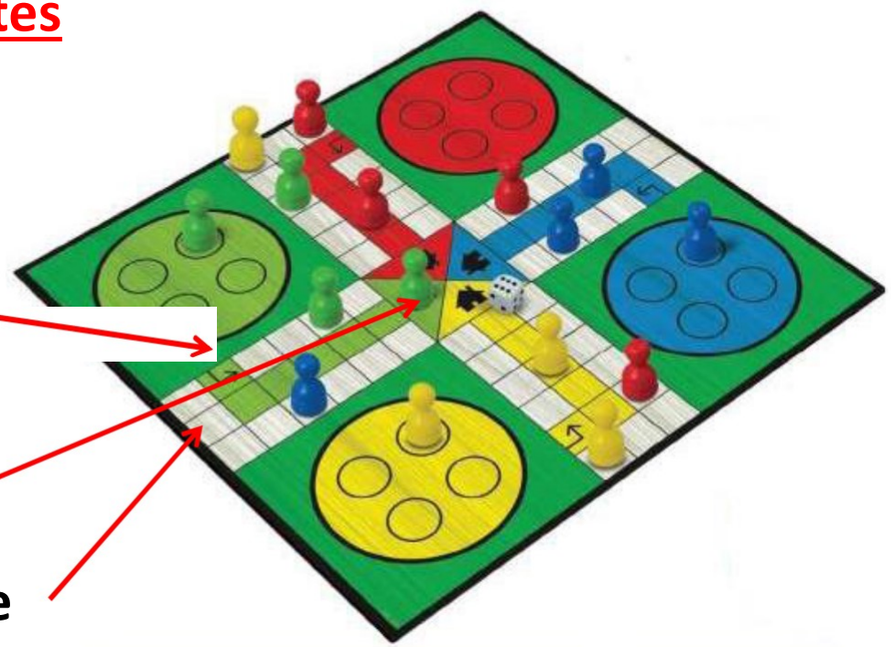
How to draw Deterministic finite automata

What is Deterministic Finite Automata?

- ✓ It's type of Finite Automata.
- ✓ It's used to define a language.
- ✓ It's a graphical Method.

Token changes Positions on the input of certain number by Dice

No. of States



Letters in alphabet

Tokens

Transition

Direction

Initial State

Final State

Normal State

Deterministic Finite Automata - What is DFA and how to draw DFA?

Plural of Automaton (i.e. automatic, self controlled machine)

Next state is known
(Has only one next state)

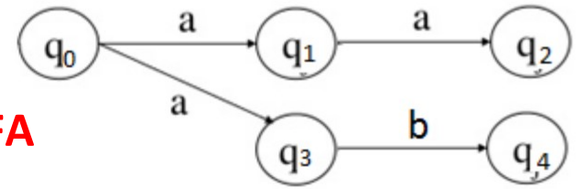
Finite number of states, letters and transitions

Q: Number of States
Q_0: Initial State
F: Final State
∑: Letters in Alphabet
∂: Transitions / Movements

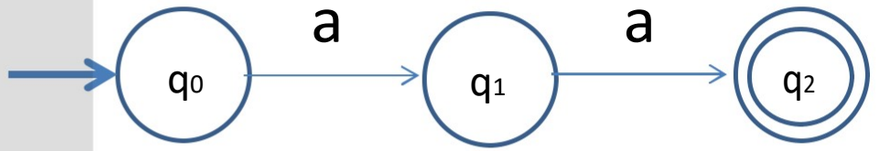
Symbols:

DFA

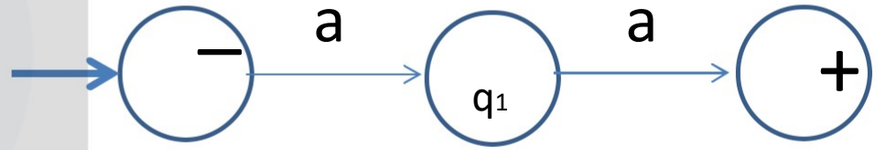
NFA



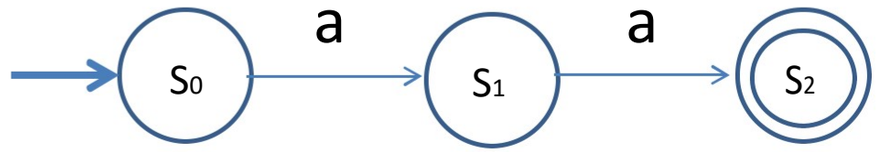
L1 = {aa}



Initial State — Final State



Initial State — Final State



Initial State — Final State

Deterministic Finite Automata - What is DFA and how to draw DFA?

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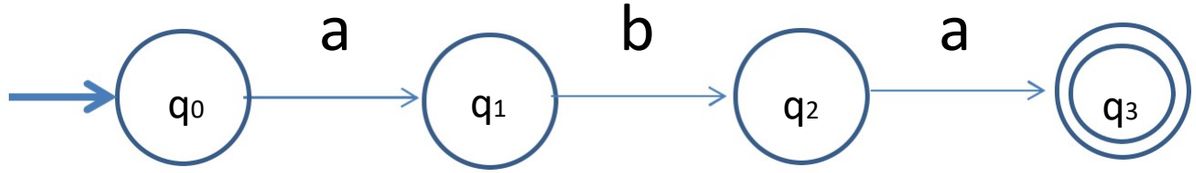
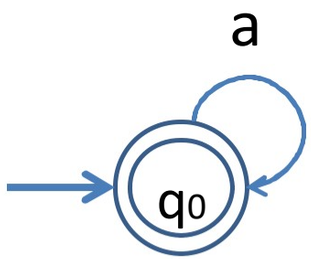
L2 = {aba}



loop

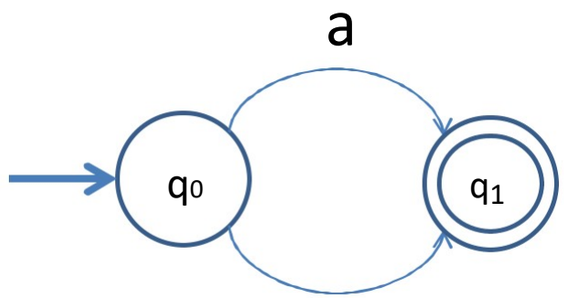
a*



Contains any no of a's

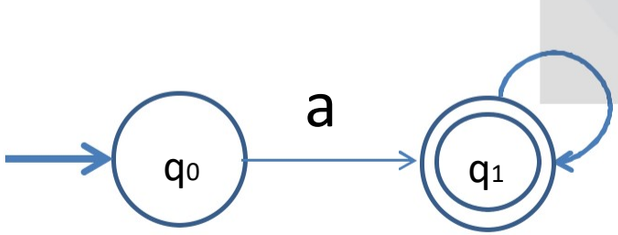
Contains **a** or **b**

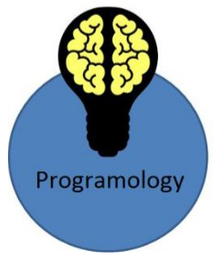
a+b

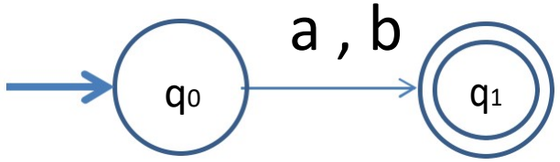


Starts with a and contains any number of b's in end

ab*







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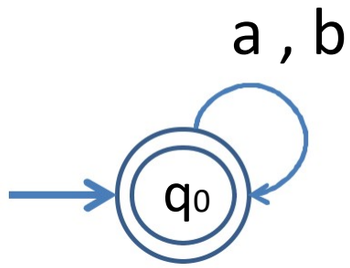
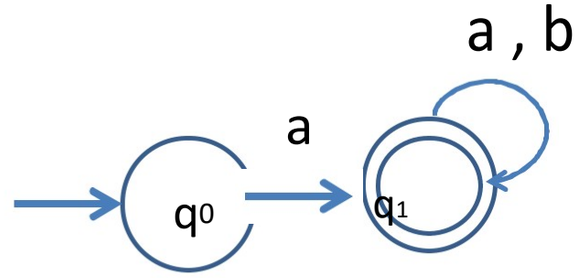
Contains any number of **a's** or **b's**

(a+b)*



Stars with **a**

R = a(a+b)*



Programology

Deterministic Finite Automata - What is DFA and how to draw DFA?

Definition:

- ✓ It's a type of Finite Automata that used to define languages **in which next state is already known**
- ✓ It consists of following 5 Parts;

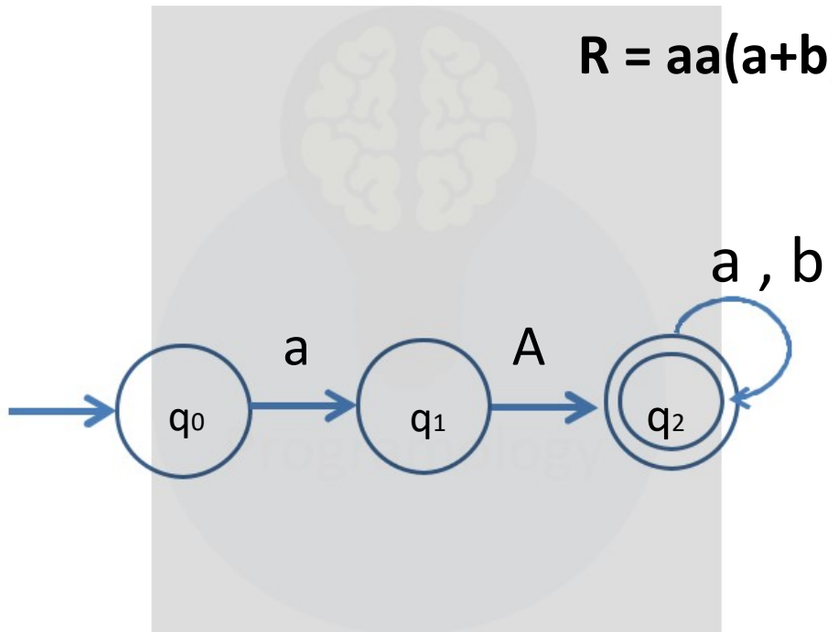
FA: {Q, Q_0, F, ∑, ∂}

Q: Number of States
Q_0: Initial State
F: Final State
∑: Letters in Alphabet
∂: Transitions / Movements

How to draw Deterministic finite automata

DFA for a language that starts with **aa**

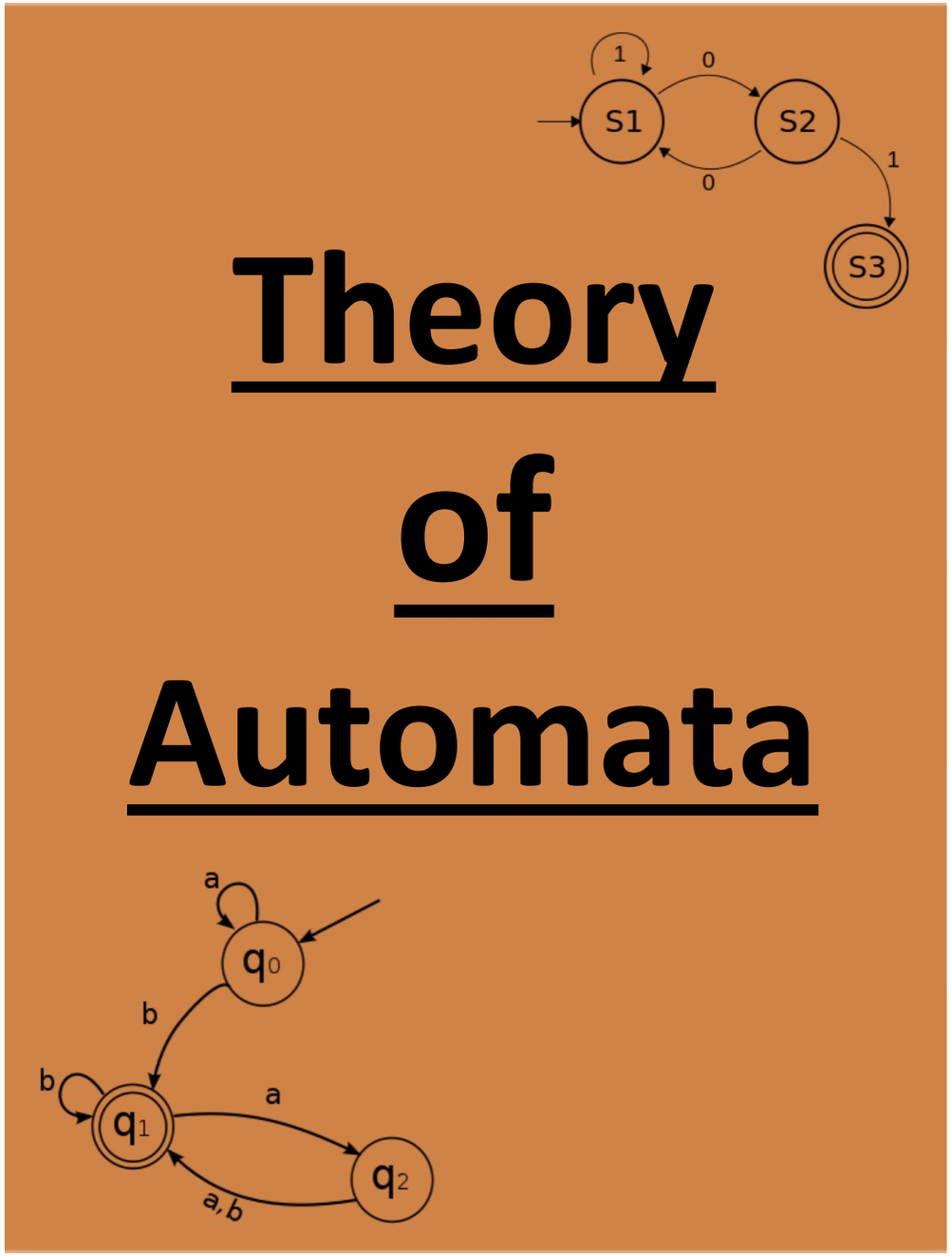
R = aa(a+b)*



- Circle/Ovals for Initial State, Normal State and Final State
- Arrow for Transition with letters above
- Loop and OR
- Only one output; single letter can not go to multiple state from one state

What is it named as Deterministic Finite Automata?

Automata: Plural of Automaton (i.e. automatic, self controlled machine)
Finite: Finite number of states / letters/ transitions
Deterministic: Output is already known (has only one next state)



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Thank you ☺