

Programming

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Intended Learning Outcomes

- Write a simple program as a nondeterministic finite-state automaton (NFA).
- Write a simple program as a deterministic finite-state automaton (DFA).
- The ability to differentiate between a NFA and a DFA.


Programming Languages

What Programming Languages do you know?

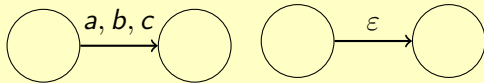
NFA

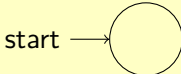
- An alphabet that is a finite set of symbols e.g.


- English Alphabet.
- Hindu–Arabic numerals.
- Morse code symbols.

- A finite set of states 

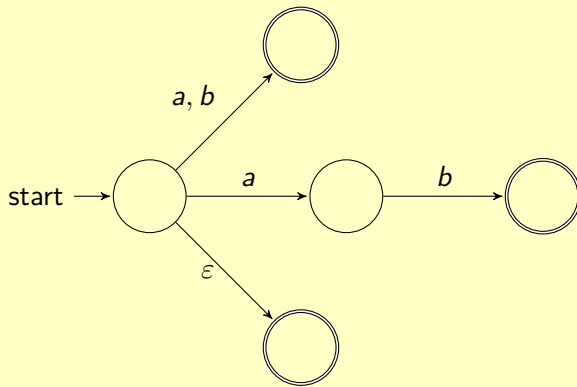
- Transitions between states labelled by symbols or ϵ .



- A single initial state. 

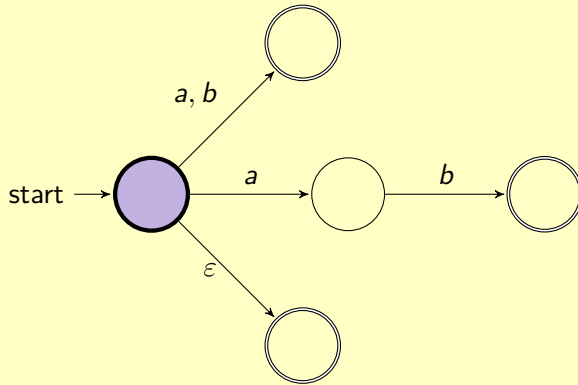
- Zero or more accepting states. 

NFA Simulation



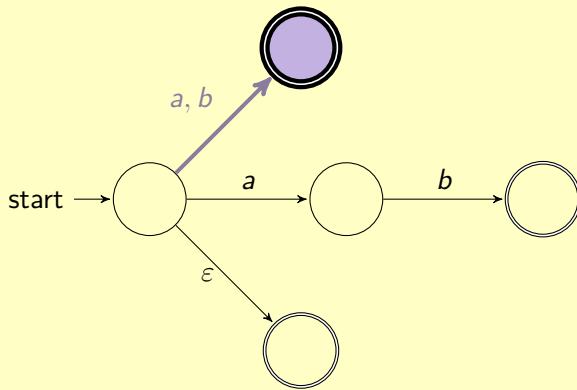
ab

NFA Simulation



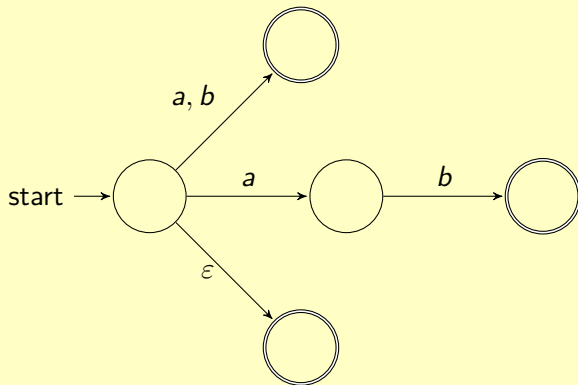
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NFA Simulation



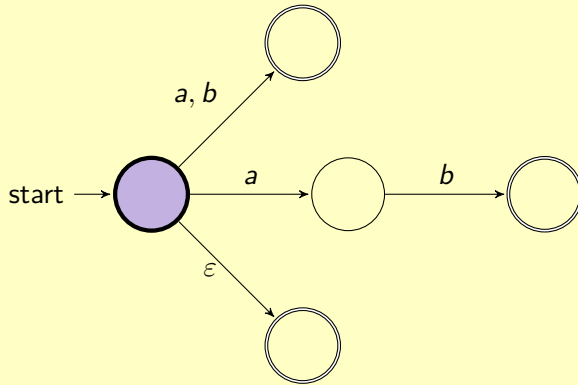
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NFA Simulation



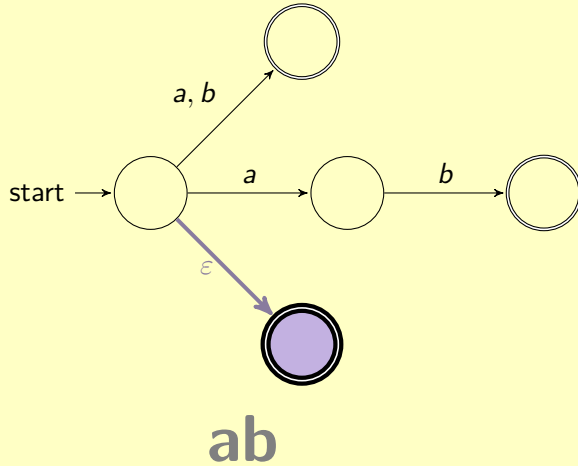
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NFA Simulation

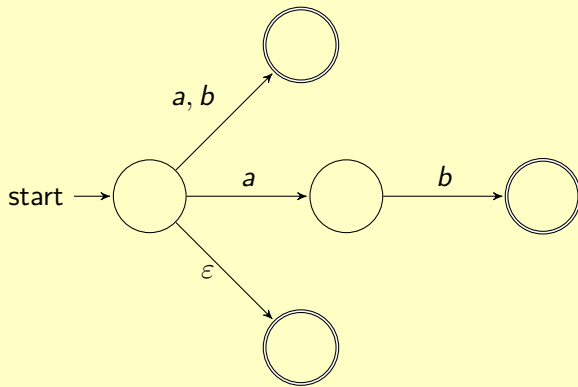


ab

NFA Simulation

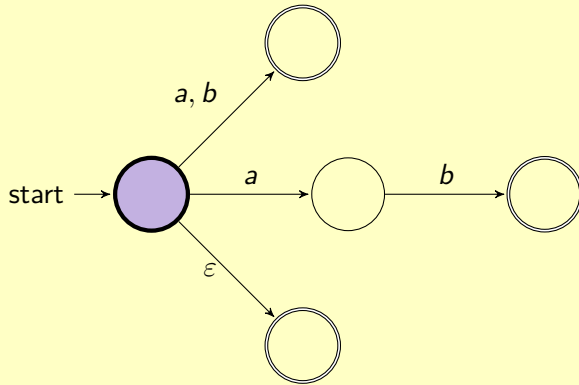


NFA Simulation



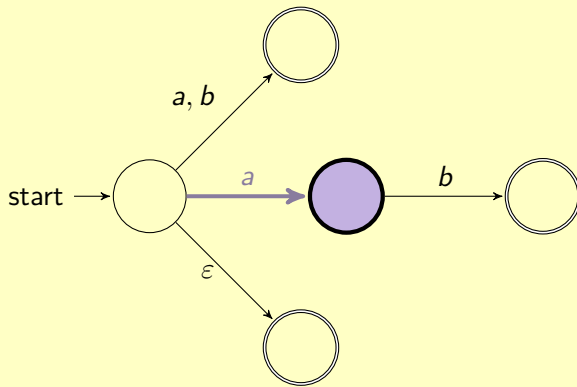
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NFA Simulation



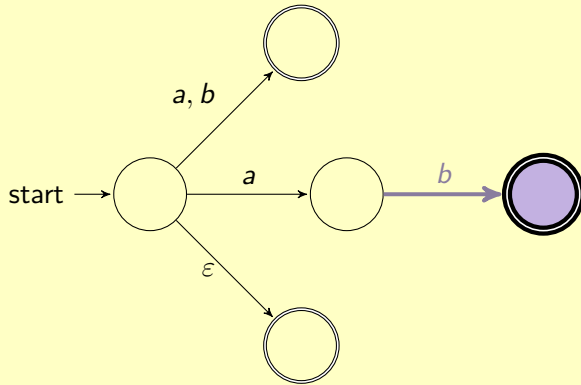
ab

NFA Simulation



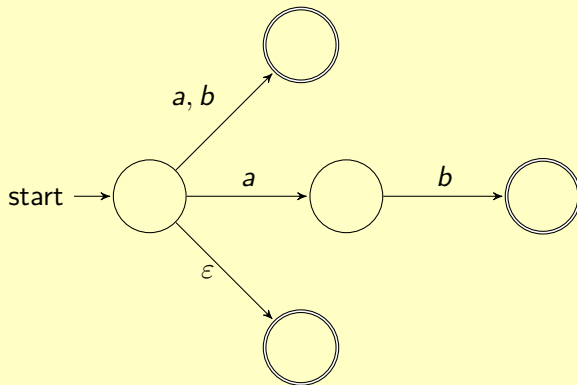
ab

NFA Simulation



ab

NFA Simulation



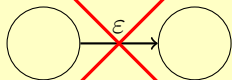
ab Accepted!

Your turn

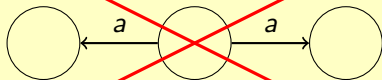
Create a NFA that determines if a non-negative integer is even.

DFA

- Subset of NFAs.
- No ϵ transitions allowed.



- No state may have more than one outgoing transition per symbol.



- Why do this?

Your turn

Create a DFA that determines if a non-negative integer is even.

We are done

We are done.