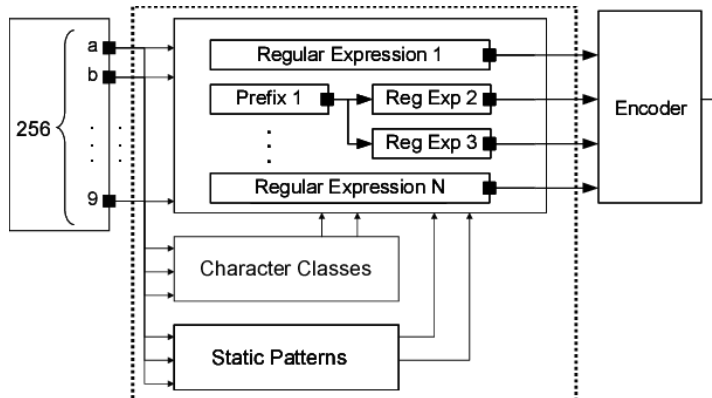
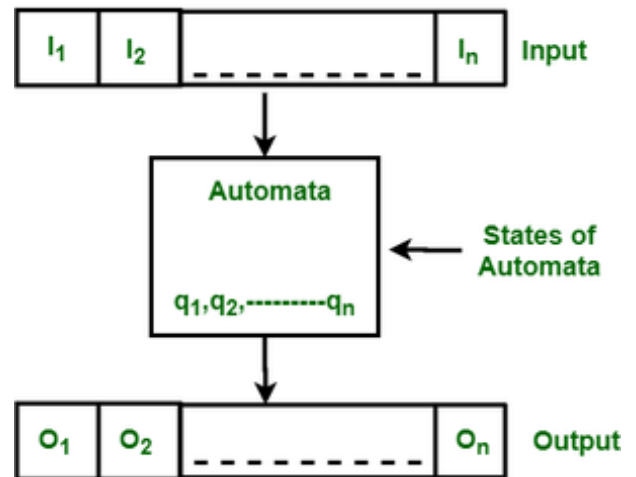


# Digital Circuit Design

## Automata Theory

### AT topics used

- Finite-State Machines (FSMs)
- Deterministic Finite Automata (DFA)
- Nondeterministic Finite Automata (NFA)
- State Transition Diagrams
- Mealy and Moore Machines
- Regular Expressions
- Formal Language Theory



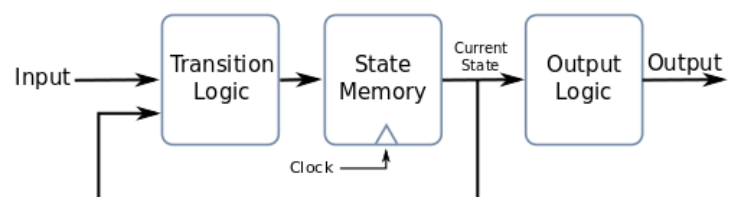
### Application

- Modeling Sequential Circuits
- Control Unit Design in Microprocessors
- Simulation of Circuit Behavior
- Formal Verification of Circuit Designs
- Optimization of Circuit Layouts
- Testing and Debugging of Digital Systems

### Benefits of Using Automata

- Efficiency: Reduces circuit complexity and enhances reliability.
- Modularity: Facilitates easier design and debugging.
- Verification: Formal methods for verifying circuit correctness.
- Scalability: Supports large, complex systems by managing state transitions effectively.

#### # Moore Machine



#### # Mealy Machine

