Jan Karl Z. Mandani September 12, 2024  
BSCS 3-C

**Finite Automata**

Finite Automata (FA) is a computational model used to represent and recognize patterns or languages. It consists of states and transitions between those states, based on input symbols. FA can be deterministic or non-deterministic and is used to model simple systems or decision-making processes.

**Deterministic Finite Automata**

It is a type of finite automata where, for each state and input symbol, there is exactly one possible next state. DFAs are used to recognize regular languages, and they ensure that for every possible input, the transition to the next state is unambiguous.

**Parts of a DFA**

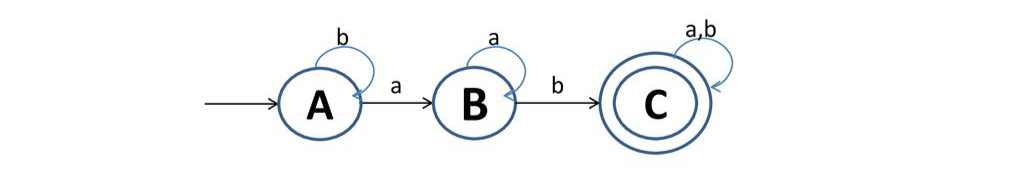
1. **Q (Set of States):**
   * The set of all possible states the automaton can be in. Each state represents a unique configuration of the system.
2. **Σ (Alphabet):**
   * The finite set of symbols that the DFA accepts as input. These symbols form the alphabet of the language the DFA recognizes.
3. **δ (Transition Function):**
   * A function δ: Q × Σ→Q, which defines the state transitions. It maps a pair of current state and input symbol to the next state.
4. **q0 (Start State/ Initial State):**
   * The state at which the DFA begins its operation. It's a special state from which the DFA starts processing the input.
5. ***F* (Set of Accepting/Final States):**
   * A subset of Q that contains one or more states where the DFA can terminate and accept the input. If the DFA ends up in one of these states after processing an input string, the input is accepted.

**Draw a DFA with Σ = {a, b} that all strings start at a and ends with b.**

*L* = {ab, aab, aba, bab, abb, …}

Q = {A, B, C} q0 = {A}

Σ = {a, b} *F* = {C}

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