

- What is a Finite Automaton, and how does it work?

Answer:

A Finite Automaton (FA) is a simple computational model used to recognize regular languages. It consists of:

- A finite set of states (Q)
- An input alphabet (?)
- A transition function (?)
- An initial state (q?)
- A set of accepting (final) states (F)

Working Principle:

- The automaton reads input symbols one by one.
- It transitions between states based on the transition function.
- If after processing the entire input, the automaton ends in an accepting state, the input string is accepted; otherwise, it is rejected.

- What is the difference between Deterministic Finite Automaton (DFA) and Nondeterministic Finite Automaton (NFA)?

Answer:

| Feature | DFA | NFA |

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| Transition | Exactly one transition per symbol from each state | Zero, one, or multiple transitions per symbol |

| Determinism | Fully deterministic | Nondeterministic (can have multiple choices or ?-transitions) |

| Equivalence | Both recognize regular languages | Both recognize the same class of languages (regular) |

| Implementation | Easier to implement | More flexible but equivalent in power to DFA |

