1. A finite automaton (FA) is a simple idealized machine used to recognize patterns within input taken from some character set (or alphabet) C. The job of an FA is to accept or reject an input depending on whether the pattern defined by the FA occurs in the input. A finite automaton is represented formally by a [5-tuple](https://en.wikipedia.org/wiki/N-tuple" \o "N-tuple) i.e Q, [Σ](https://en.wikipedia.org/wiki/Sigma" \o "Sigma), [δ](https://en.wikipedia.org/wiki/Delta_(letter)" \o "Delta (letter)),q0,F, where:

* Q is a finite set of states.
* [Σ](https://en.wikipedia.org/wiki/Sigma" \o "Sigma) is a finite set of [symbols](https://en.wikipedia.org/wiki/Symbol" \o "Symbol), called the [alphabet](https://en.wikipedia.org/wiki/Alphabet_(computer_science)" \o "Alphabet (computer science)) of the automaton.
* [δ](https://en.wikipedia.org/wiki/Delta_(letter)" \o "Delta (letter)) is the transition function, that is, δ: Q × Σ → Q.
* q0 is the start state, that is, the state of the automaton before any input has been processed, where q0∈ Q.
* F is a set of states of Q (i.e. F⊆Q) called accept states.

