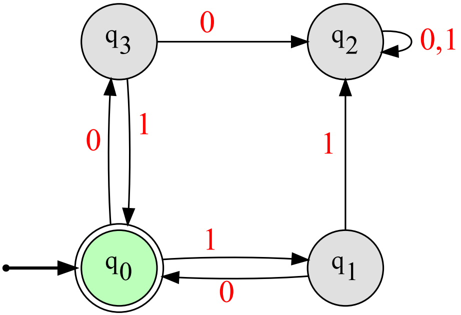
3.1.1

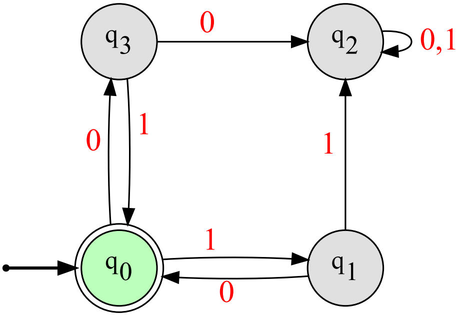
Graphical representation of DFA

Graphical Representation/State Machine



- Directed graph with nodes representing states and edge/arcs representing transitions labeled by symbols in Σ
- For each state (vertex) q and symbol $a \in \Sigma$ there is exactly one outgoing edge labeled by a
- Initial/start state has a pointer (or labeled as s, q_0 or "start")
- Some states with double circles labeled as accepting/final states

Graphical Representation



- Where does 001 lead?
- Where does 10010 lead?
- Which strings end up in accepting state?
- Can you prove it?
- Every string w has a unique walk that it follows from a given state q by reading one letter of w from left to right.

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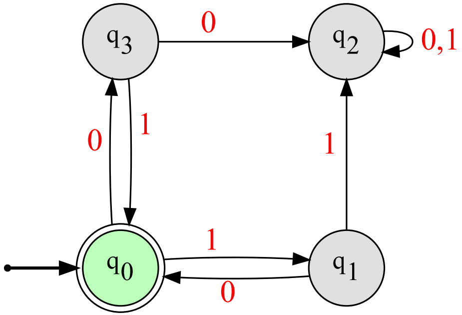

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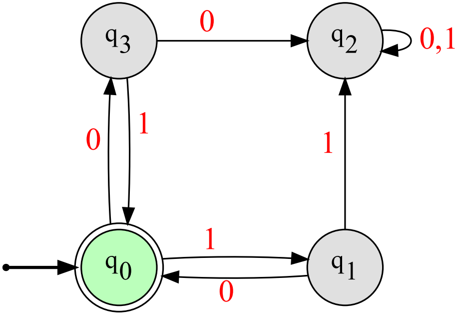

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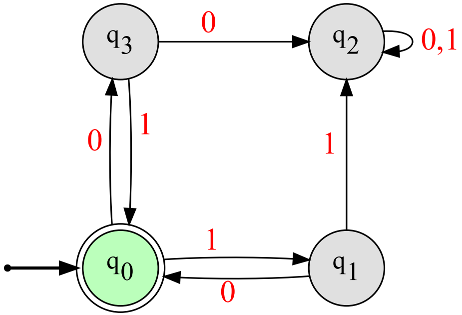

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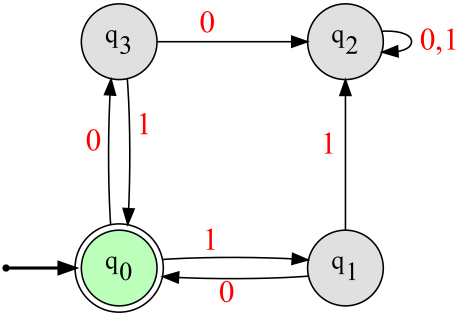

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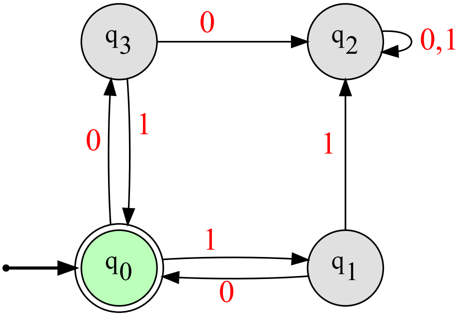

Definition

A DFA M accepts a string w iff the unique walk starting at the start state and spelling out w ends in an accepting state.

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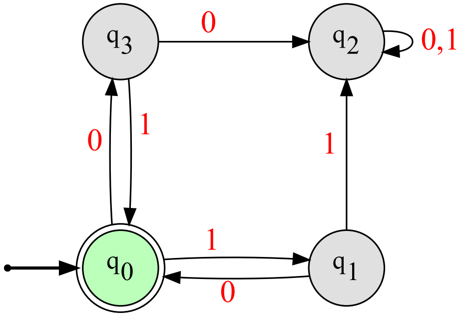
Graphical Representation



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Definition

The language accepted (or recognized) by a DFA M is denote by $L(M)$ and defined

Warning

"M accepts language L" does not mean simply that that M accepts each string in L.

It means that M accepts each string in L and no others. Equivalently M accepts each string in L and does not accept/rejects strings in $\Sigma^* \setminus L$.

M "recognizes" L is a better term but "accepts" is widely accepted (and recognized) (joke attributed to Lenny Pitt)

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THE END

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(for now)