Theory of Computation

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References: Lectures by Stephen Cranefield in COSC341 at the University of Otago, New Zealand; tikz tutorial by Satyaki Sikdar

Contents

1 Deterministic Finite State Automaton (DFAs)

DEF: A *deterministic finite state automaton (DFA)*, **A**, consists of the following:

- A finite set Σ called its alphabet,
- A finite set $\mathcal{S}$ called its states,
- A function $T : \mathcal{S} \times \Sigma \to \mathcal{S}$ called its transition function,
- A single element $s \in \mathcal{S}$ called its start state,
- A subset $A \subseteq \mathcal{S}$ called its final states or accepting states.

We begin with an example. Consider a light with two switches. Flipping either switch changes the state of the light.

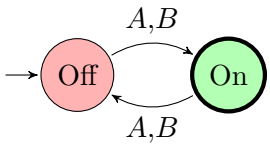

Figure 1: Two buttons, one light

another example: