Contents & Goals

Last Lecture:
• Rhapsody code generation
• Interactions: Live Sequence Charts
• LSC syntax

This Lecture:
• Educational Objectives:
  - Capabilities for following tasks/questions.
• How is the semantics of LSCs constructed?
• What is a cut, fired-set, etc.?
• Construct the TBA for this LSC.
• Give one example which (non-)trivially satisfies this LSC.

Content:
• Symbolic Automata
• Firedset, Cut
• Automaton construction
• Transition annotations
Example

Let $\Sigma = \{ 0, 1 \}$.

Define $\sigma : \Sigma \to \{ \text{false}, \text{true} \}$ such that $\sigma(0) = \text{false}$ and $\sigma(1) = \text{true}$.

Consider the expression $\sigma(w)$ where $w$ is a word for which

- There is a transition $q_0 \xrightarrow{\epsilon} q_1$.
- For each valuation $\sigma$ of logical variables to domain $D$, $\sigma(w)$ holds.

Thus, $\sigma(w)$ holds for all infinite sequences of symbols in $\Sigma^\omega$.

This example illustrates the use of logical variables in defining properties of infinite sequences.

From Finite Automata to Symbolic Büchi Automata
The Language of a TBA

Let $T = (Q, \Sigma, \delta, q_0, F)$ be a TBA, where

- $Q$ is a finite set of states,
- $\Sigma$ is a finite set of input symbols,
- $\delta: Q \times \Sigma \rightarrow Q$ is the transition function,
- $q_0 \in Q$ is the initial state,
- $F \subseteq Q$ is the set of final states.

The language of $T$ is defined as

$$L(T) = \{ w \in \Sigma^* \mid (q_0, w) \rightarrow^{*} (q, \lambda) \text{ for some } q \in F \}.$$