Uppaal Demo

Outline

- The Light Controller Example
- Creating Automata Templates
- Simulation
- Specifying Properties
- Verification
Creating Automata Templates

- **Locations**
  - Name, invariants or comments (double click on locations)
  - Setting initial, urgent, and commented (right click menu)

- **Edge**
  - Location to location connection, routed with “Nails”
  - Setting Properties (double click on an edge)
    - Selections, Guards, Synchronization, and Updates
    - Selections are randomized initialization of some variable in a range whenever an edge is executed
      - E.g., “i: int[3,5]” – randomly set i to be between 3 to 5, inclusively
Creating Automata Templates

- **Declarations**
  - **Scope**
    - Local: used by an instance of a template itself
    - Global: used by all automata instances
  - Variables and function definitions

- **System Declarations**
  - Instantiate templates
  - Composing a system

- **Syntax Checking**

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The Light Controller Example

![Light Controller Diagram]

- **Light**
- **Button**

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Simulation

Enabled Transitions
Simulation Trace
Controls
Variable Values
System

Synchronization History
Simulation

- **Step-by-step simulation**
  - Good for observations of variable values at each step
  - Manually selecting transitions (when many are enabled)
  - Good for tracing errors

- **Automatic simulation**
  - Good for observing overall system behavior

- **Saving/Opening Simulation Traces**

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Specifying Properties

- **A not deadlock**
  - no deadlocks
  - true

- **E L.OFF**
  - is it possible that the light is always OFF
  - true

- **E<> (L.ON and L.x>3)**
  - it is possible that the light isn't pressed a second time within 3secs after it's turned on
  - true

- **A<> L.OFF**
  - no matter how you operate the light, it will go to OFF
  - true

- **A<> L.BRIGHT**
  - no matter how you operate the light, it will go to BRIGHT
  - false
Verification

- Loading the error trace into the simulator
  - Menu → Options → Diagnosis Trace → Shortest
- Replaying the trace

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- A Final Note
  - The Uppaal help is handy information