An Example of How to Use StatSim

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1 StateSim: Simple Simulation of Statecharts Models

- Statecharts is a visual formal method to model reactive, real-time, concurrent systems.

- It's an extension of FSM that reduce the state explosion problem and make very easy to describe complex reactive systems.

1.1 An Example

Door with an electronic lock.

- The door and its lock are connected to a computer.

- The door can be opened from the inside or the outside.

- If open from the outside it must be locked for 10 seconds, but, due to its internal mechanism, it can still be opened from the inside.

1.1.1 Designations

Open the door from the inside $\approx oi$

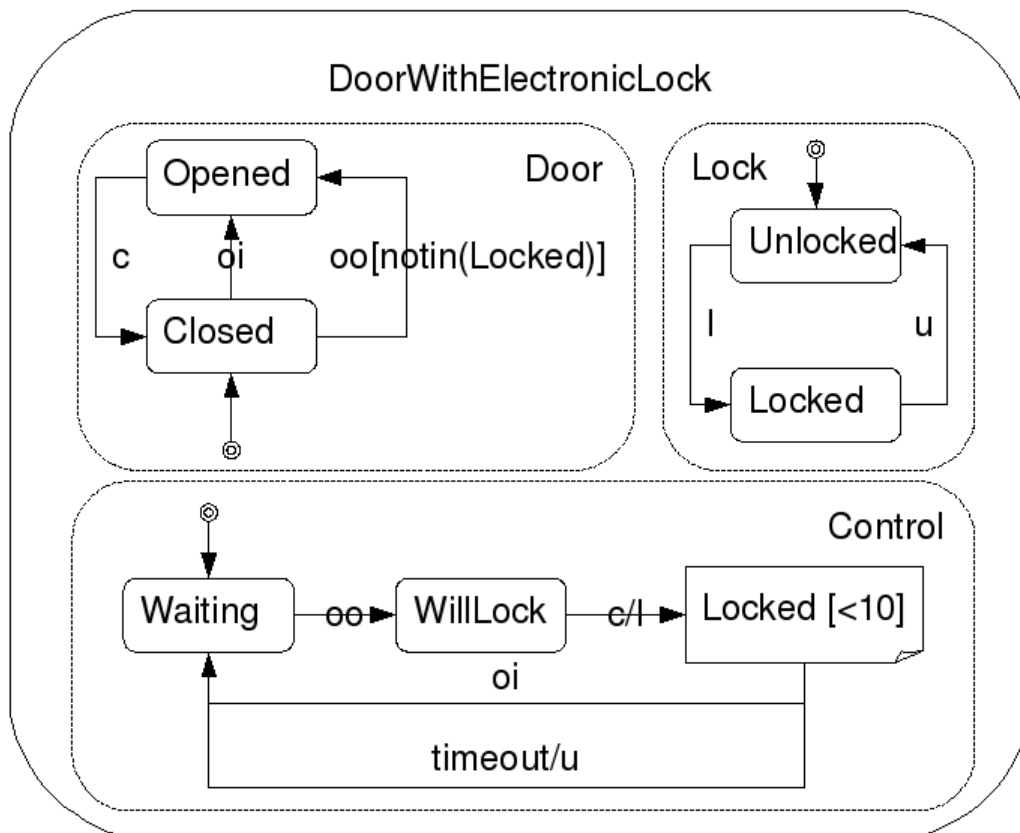Open the door from the outisde $\approx oo$

Close the doot $\approx c$

Lock the lock $\approx l$

Unlock the lock $\approx u$

1.1.2 A First Model

- The following Statechart model describes both the hardware and the control software.
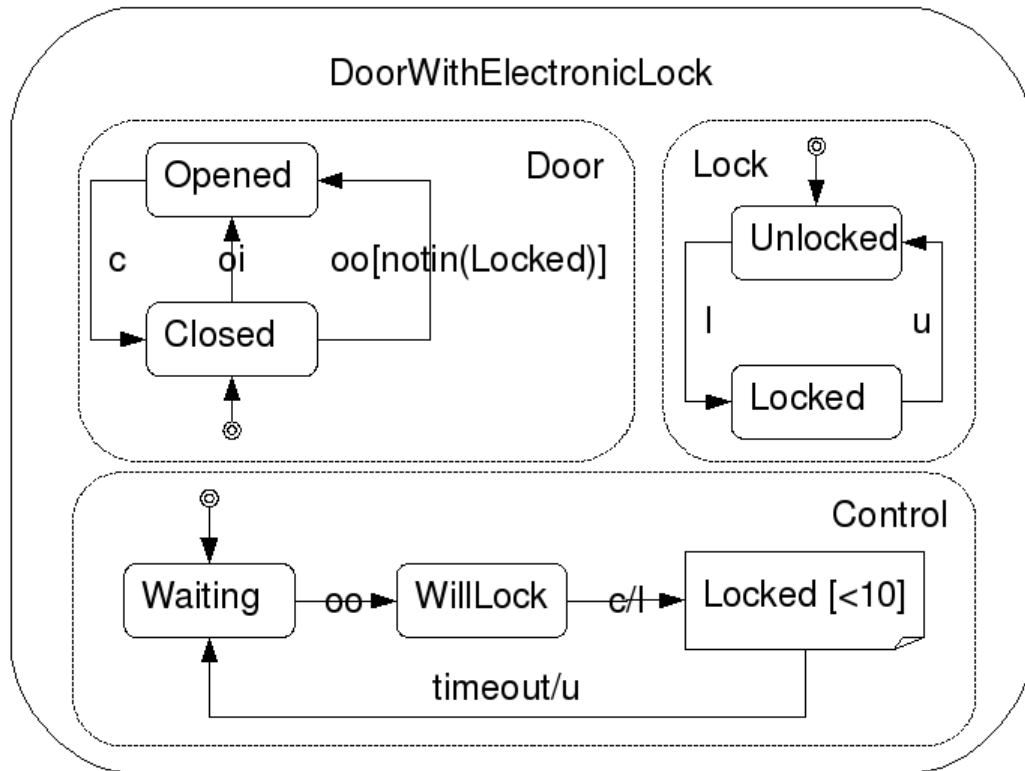
1.2 On Properties and Simulations

- Now, we want to gain confidence in whether the model is a correct interpretation of the user requirements.

- Simulating some critical situations may help not only us, but also the user because of the graphical nature of Statecharts models.

- In this example, the property to check is whether the door can be opened from the outside within the safety period.

- Simulations are chosen thinking in all of the possibilities where the property might be invalidated.

- It's a sort of test case selection (for a model, not an implementation).

- At the end of all of the following simulations the door should be closed.

    - `oi -> c -> oo -> c -> {5} -> oo`
    - `oo -> c -> oo -> {7} -> oo -> {2} -> oo`
    - `oi -> c -> oo -> c -> {5} -> oo -> oi -> c -> oo`

- The last simulation finds an error in the model. Then, we correct the model as follows.

- Now we rerun the simulation.

- StateSim does not support the full notation, yet.