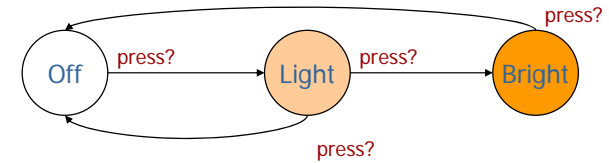


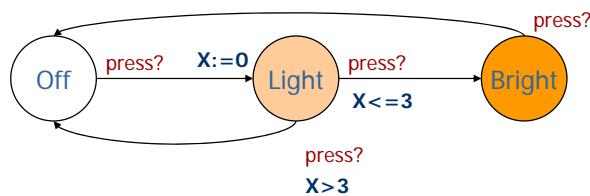
Timed Automata

Dumb Light Control



WANT: if **press** is issued twice **quickly** then the **light** will get **brighter**; otherwise the light is turned **off**.

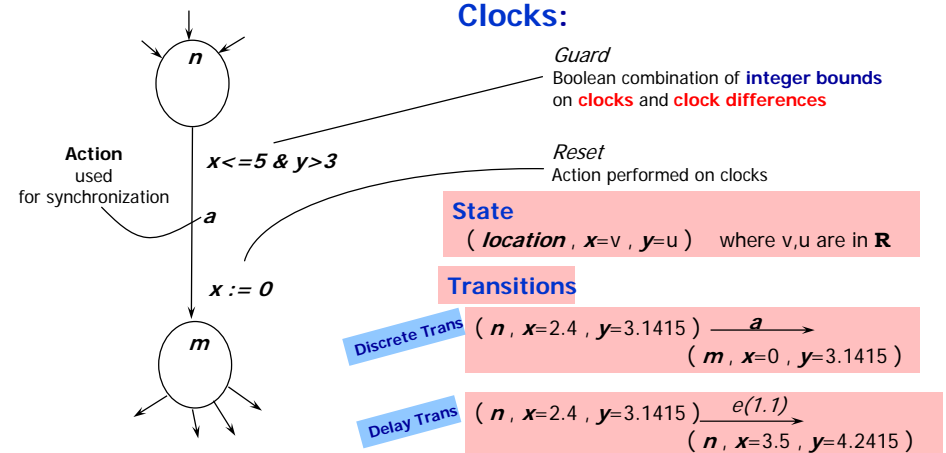
Dumb Light Control



Solution: Add real-valued clock **x**

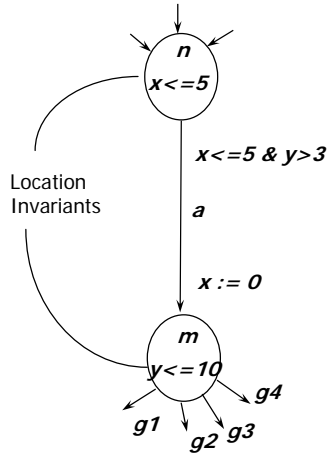
Timed Automata *review*

Alur & Dill 1990



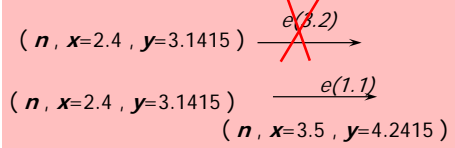
Timed Automata *review*

Invariants



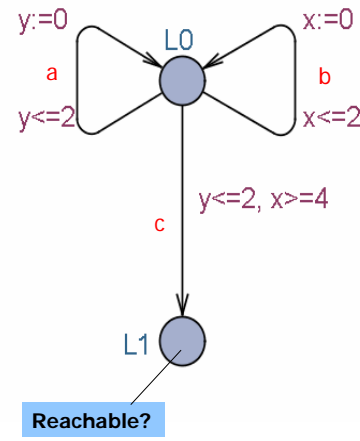
Clocks: x, y

Transitions

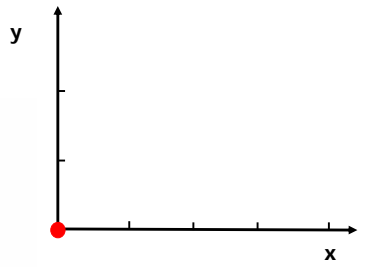
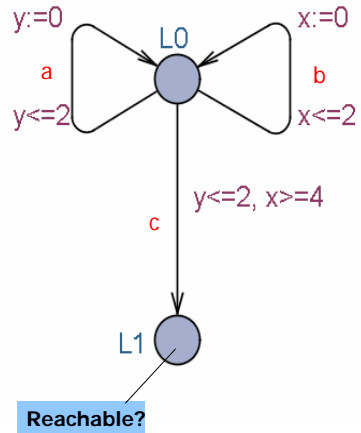


Invariants ensure progress!!

Example

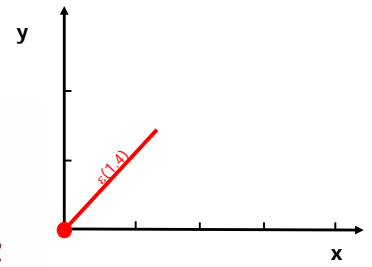
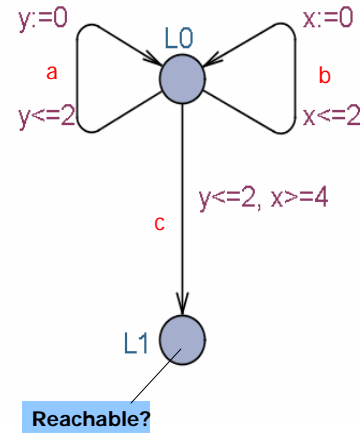


Example



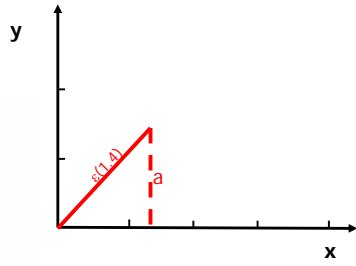
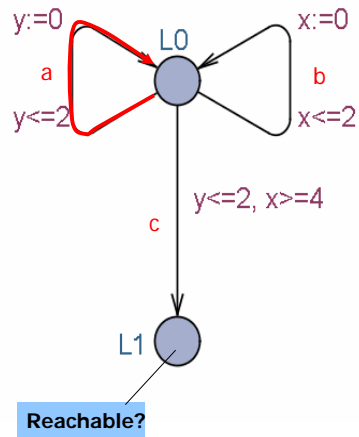
$(L0, x=0, y=0)$

Example



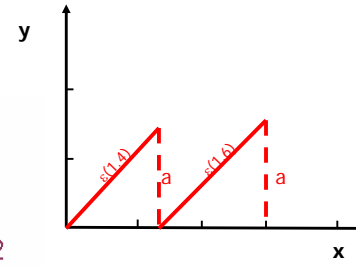
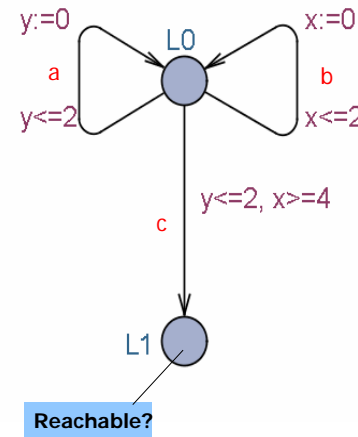
$(L0, x=0, y=0)$
 $\rightarrow_{\epsilon(1.4)}$
 $(L0, x=1.4, y=1.4)$

Example



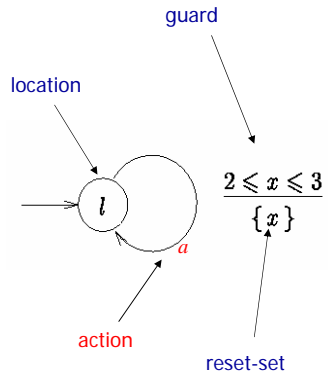
(L0, x=0, y=0)
 $\rightarrow_{\epsilon(1.4)}$
 (L0, x=1.4, y=1.4)
 \rightarrow_a
 (L0, x=1.4, y=0)

Example

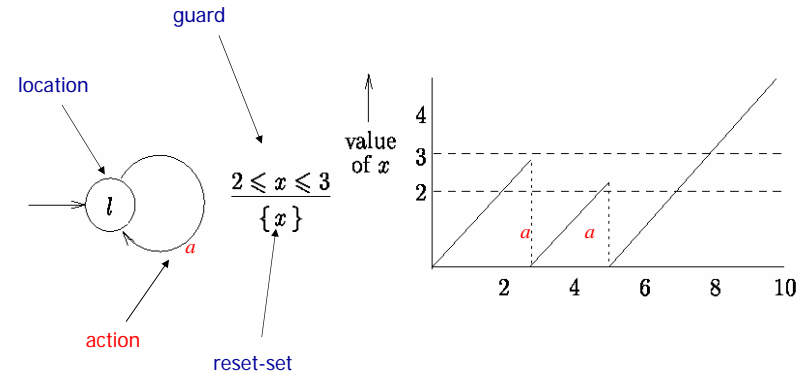


(L0, x=0, y=0)
 $\rightarrow_{\epsilon(1.4)}$
 (L0, x=1.4, y=1.4)
 \rightarrow_a
 (L0, x=1.4, y=0)
 $\rightarrow_{\epsilon(1.6)}$
 (L0, x=3.0, y=1.6)
 \rightarrow_a
 (L0, x=3.0, y=0)

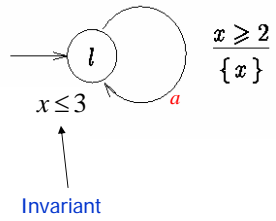
Timed Automata: Example



Timed Automata: Example



Timed Automata: Example



Timed Automata: Example

