——————— MODULE *TrafficSignalController* ———————

Design based on *traffic_light*8
EXTENDS *Naturals*, *TLC*
CONSTANT *Directions*
VARIABLE *lights*

$Init \triangleq \land lights = [dir \in Directions \mapsto \text{“red”}]$

$TypeInvariant \triangleq \land lights \in [Directions \rightarrow \{\text{“red”}, \text{“green”}, \text{“yellow”}\}]$

$LightGreen(dir) \triangleq$
$\quad \land lights[dir] = \text{“green”}$
$\quad \land lights' \quad = [lights \text{ EXCEPT } ![dir] = \text{“yellow”}]$

$LightYellow(dir) \triangleq$
$\quad \land lights[dir] = \text{“yellow”}$
$\quad \land lights' \quad = [lights \text{ EXCEPT } ![dir] = \text{“red”}]$

$LightRed(dir) \quad \triangleq$
$\quad \land lights[dir] = \text{“red”}$
$\quad \land lights' \quad = [lights \text{ EXCEPT } ![dir] = \text{“green”}]$

$DirectionNext(dir) \triangleq LightGreen(dir) \lor LightYellow(dir) \lor LightRed(dir)$

$Next \triangleq \land (\exists dir \in Directions : DirectionNext(dir))$
$\qquad\quad \land PrintT(lights)$

$NoAccident \triangleq \forall i \in Directions : (\lor (lights[i] = \text{“green”}) \lor (lights[i] = \text{“yellow”})) \Rightarrow \forall j \in Directions :$
$\qquad\qquad\qquad\qquad \lor i = j$
$\qquad\qquad\qquad\qquad \lor lights[j] = \text{“red”}$

$Spec \triangleq Init \land \Box[Next]_{\langle lights \rangle}$

——

THEOREM $Spec \Rightarrow \Box TypeInvariant$

——

\ * Modification History
\ * Last modified *Mon* May 25 13:37:46 *PDT* 2015 by Me
\ * Created *Thu* May 21 17:58:40 *PDT* 2015 by Me