MODULE *semaphore*

additional options to generate a dot file:

-dump dot;colorize ${*modelName*}.*dot*

the state of the system
VARIABLE *color*

the expected variable values
$TypeOK \triangleq color \in \{\text{“red”}, \text{“green”}, \text{“yellow”}\}$

state predicate to describe the initial states
$Init \triangleq color = \text{“red”}$

action formulas, relating states with the next ones

$TurnGreen \triangleq$
$\quad \land color = \text{“red”}$
$\quad \land color' = \text{“green”}$

$TurnYellow \triangleq$
$\quad \land color = \text{“green”}$
$\quad \land color' = \text{“yellow”}$

$TurnRed \triangleq$
$\quad \land color = \text{“yellow”}$
$\quad \land color' = \text{“red”}$

$Next \triangleq$
$\quad \lor TurnGreen$
$\quad \lor TurnYellow$
$\quad \lor TurnRed$

stardard form to describe the allowed behaviors
$Safety \triangleq Init \land \Box[Next]_{color}$

weak fairness expresses progress requirements
$Liveness \triangleq \mathrm{WF}_{color}(Next)$

every specification can be expressed as the conjunction
of a safety property and a liveness property
$Spec \triangleq Safety \land Liveness$

additional property implied by *Spec* (thanks to fairness)
$EventuallyGreen \triangleq \Box\Diamond(color = \text{“green”})$