Contents

CONTEXT TrafficLightColors

SETS

Light

CONSTANTS

red

green

AXIOMS

axm1: $Light = \{red, green\}$

axm2: $red \neq green$

END

CONTEXT PersonIO

Descripcion de la persona si está fisicamente dentro o fuera de la habitacion

SETS

PersonIOState

CONSTANTS

in

out

AXIOMS

axm1: $PersonIOState = \{out, in\}$

axm2: $out \neq in$

END

CONTEXT SensorIO

Contexto donde se describe los estados del sensor

SETS

SensorState Conjunto de estados del sensor

CONSTANTS

on Señal del sensor on

off Señal del sensor off

AXIOMS

axm1: $SensorState = \{off, on\}$

axm2: $off \neq on$

END

CONTEXT Room

SETS

RoomState

CONSTANTS

empty

full

AXIOMS

axm1: $RoomState = \{empty, full\}$

axm2: $empty \neq full$

END

MACHINE m0

Primera implementacion del modelo. Se considera la entrada y la salida de una persona sin ningún tipo de restricción externa al aforo de la habitación.

SEES Room

VARIABLES

room

INVARIANTS

inv1: $room \in RoomState$

EVENTS

Initialisation ⟨extended⟩

begin

act1: $roomempty$

end

Event Person_Go_In ⟨ordinary⟩

when

grd1: $room = empty$

then

act1: $roomfull$

end

Event Person_Go_Out ⟨ordinary⟩

when

grd1: $room = full$

then

act1: $roomempty$

end

END

```
MACHINE m1
REFINES m0
SEES Room,TrafficLightColors
VARIABLES
          room
          tfl Traffic Light Variable
INVARIANTS
          inv1:   tfl ∈ Light
EVENTS
Initialisation ⟨extended⟩
        begin
                act1: roomempty
                act2: tflred
        end
Event Person_Go_In ⟨ordinary⟩
extends Person_Go_In
        when
                grd1:   room = empty
                grd2:   tfl = green
        then
                act1: roomfull
                act2: tflred
        end
Event Person_Go_Out ⟨ordinary⟩
extends Person_Go_Out
        when
                grd1:   room = full
        then
                act1: roomempty
        end
Event Traffic_Switch_Green ⟨ordinary⟩
        Esto es para que la señal conozca el estado del environment (debido a la ausencia del sensor de salida)
        when
                grd1:   room = empty
                grd2:   tfl = red
        then
                act1: tflgreen
        end
END
```

MACHINE m2
REFINES m1
SEES Room,TrafficLightColors,SensorIO,PersonIO
VARIABLES

room
tfl Traffic Light variable
ss Sensor variable
wio Wire from sensor to controller
p Person In/Out variable

INVARIANTS

inv_room1: $room = fulltfl = red$
inv_room2: $room = fullp = in$
inv_ss1: $ss \in SensorState$
inv_ss2: $ss = onwio = 0$
inv_ss3: $ss = off \land wio = 0tfl = red$
inv_wio1: $wio \in \{0, 1\}$
inv_wio2: $wio = 1tfl = green$
inv_wio3: $wio = 0(p = in \land room = full) \lor (p = out \land room = empty)$
inv_wio4: $wio = 1p = in \land room = empty$
inv_p1: $p \in PersonIOState$
inv_p2: $p = outroom = empty$

EVENTS

Initialisation ⟨extended⟩

begin

act1: $roomempty$
act2: $tflred$
act4: $wio0$
act3: $ssoff$
act5: $pout$

end

Event Person_Go_In ⟨ordinary⟩

Event where the controller knows the signal from the cable (which assumes a person has entered) and then changes the state.

refines Person_Go_In

when

grd1: $room = empty$
grd2: $wio = 1$

then

act1: $roomfull$
act2: $wio0$
act3: $tflred$

end

Event Person_Go_Out ⟨ordinary⟩

Exit event. As there is no exit sensor, we can assume that both states (To be inside and room is full) change simultaneously.

extends Person_Go_Out

when

grd1: $room = full$
grd2: $p = in$

then

act1: $roomempty$
act2: $pout$

end

Event Traffic_Switch_Green ⟨ordinary⟩

Event where sensor is on and it is satisfied that entry can be allowed.

```
extends Traffic_Switch_Green
    when
        grd1:  $room = empty$
        grd2:  $tfl = red$
        grd3:  $ss = on$
    then
        act1: $tflgreen$
    end
Event Sensor_Turn_On ⟨ordinary⟩
    Event where sensor is on with no one is staging
    when
        grd1:  $ss = off$
        grd2:  $wio = 0$
    then
        act1: $sson$
    end
Event Person_Go_Out_Sensor ⟨ordinary⟩
    Event where situation satisfied that person who is waiting, can go inside.
    when
        grd1:  $tfl = green$
        grd2:  $ss = on$
    then
        act1: $pin$
            Person physically go inside
        act2: $ssoff$
            sensor is turned off
        act3: $wio1$
    end
END
```