1 Traffic Light Controller

As illustrated by Figure 1, the traffic light controller controls four lights, namely, two lights for the pedestrians and two for the cars.
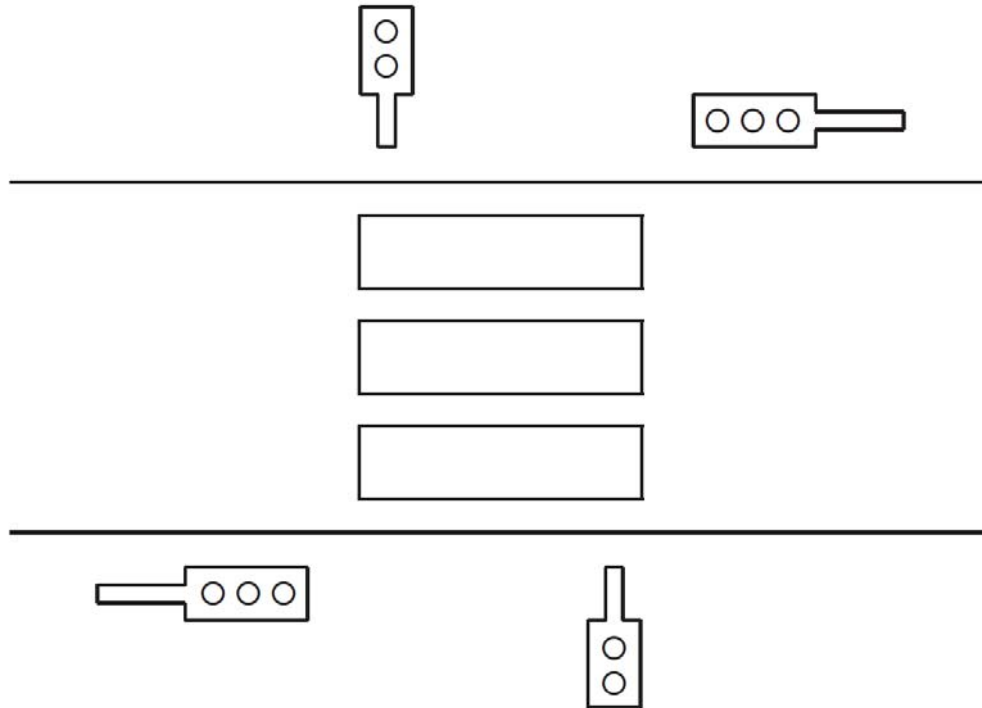

Figure 1   **Pedestrian road crossing**

Initially, the traffic light is red for the pedestrians and green for the cars. Each of the two traffic lights for the pedestrians has a button. If a pedestrian presses one of these buttons while the lights for the cars are green and the lights for the pedestrians are red, the traffic lights turn yellow and then red for the cars and finally green for the pedestrians. After a while the lights turn back to their initial positions, but in the opposite order. We make use of the following four types of signals to describe the controller:

$$
\begin{aligned}
\text{type } Col &= green \mid yel \mid red \\
\text{type } Par &= car \mid ped \\
\text{type } Con &= set(c \in Col, p \in Par) \\
\text{type } Act &= req \mid ack(n \in Col, p \in Par)
\end{aligned}
$$

The interaction between the controller and the traffic light is assumed to be acknowledgement driven.

Define a UML state machine for the traffic light controller ignoring timing aspects, and the handling of exceptions and malfunctions.