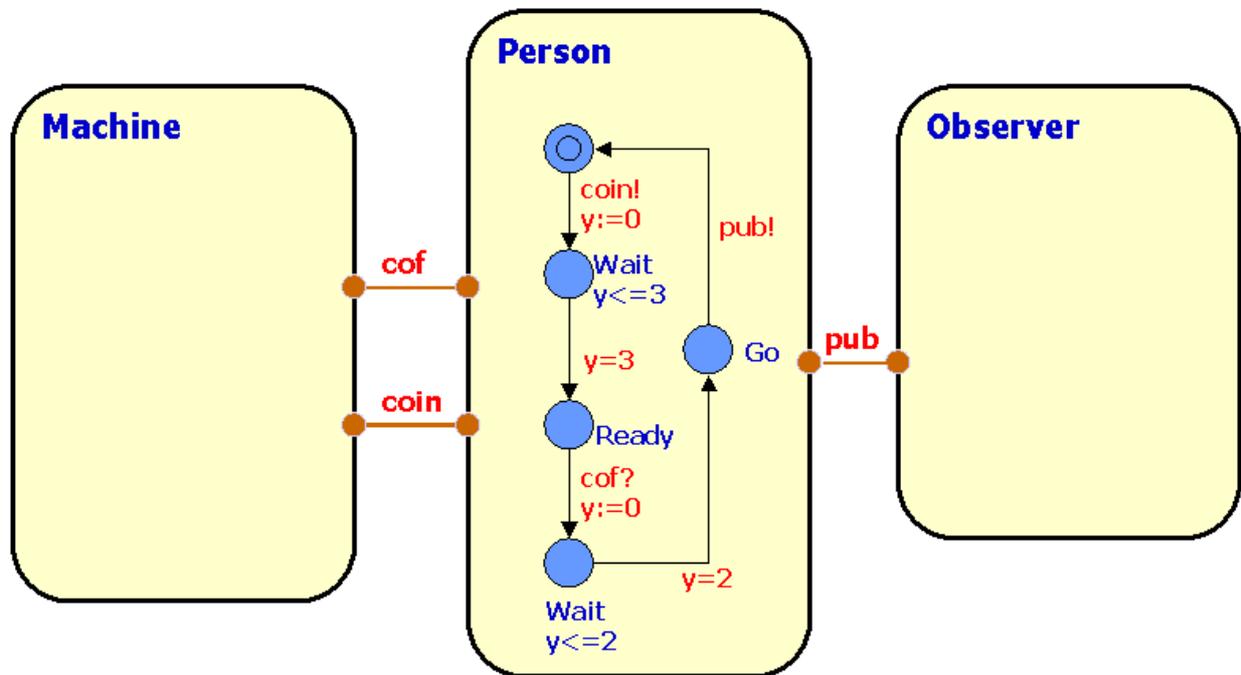


A Coffee Machine



As you all know, large amount of coffee is a necessity to produce good results, (especially in academia). This first assignment lets you construct a system which maximises the number of (academic) publications produced.

You are asked to design the control of a (coffee) **Machine** (the control program) which will serve a coffee craving **Person** (eg. a PhD student). As you can see above the Person repeatedly (tries to) insert a coin, (tries to) extract coffee after which (s)he will make a publication. Between each action the Person requires a suitable time-delay before being ready to participate in the next one.

After receiving a coin the Machine should take some time for brewing the coffee. The Machine should time-out if the brewed coffee has not been taken before a certain upper time-limit.

As a requirement we want the overall behaviour to ensure that the indicated **Observer** (eg. some demanding professor or funding institute) experiences a constant flow of publications from the Person. In particular we want the Observer to complain if at any time more than 8 time-units elapses between two consecutive publications. Model the Machine and Observer in UPPAAL and analyse the behaviour of the system.

An autonomous Elevator

Consider an autonomous elevator which operates between two floors. The requested behavior of the elevator is as follows:

1. The elevator can stop either at the ground floor or the first floor. When the elevator arrives at a certain floor, its door automatically opens. It takes at least 2 seconds from its arrival before the door opens but the door must definitely open within 5 seconds.
2. Whenever the elevator's door is open, passengers can enter. They enter one by one and we (optimistically) assume that the elevator has a sufficient capacity to accommodate any number of passengers waiting outside.
3. The door can close only 4 seconds after the last passenger entered. After the door closes, the elevator waits at least 2 seconds and then travels up or down to the other floor.

Suggest a timed automaton model of the elevator. Use the actions 'up' and 'down' to model the movement of the elevator, 'open' and 'close' to describe the door operation and the action 'enter' which means that a passenger is entering the elevator.

Source: <http://www.ru.is/kennarar/luca/GSSI/TUTORIALS/tutorial-ta1.pdf>