Daniela-Rebeca Sabau
Alexandru-Mihai Sabou
Balazs-Barna Moldovan
Ioan-Eugen Tudor
Andrada-Giorgiana Mereu
Vlad-Eduard Dumitrescu
Ioana-Gabriela Chelaru

Q1: The mode FF corresponds to the case when each process is in the mode Full. The clock-invariant of this mode is the conjunction $(y_1 \leq \mathtt{UB}_1 \wedge y_2 \leq \mathtt{UB}_2)$. Thus, the composite process can wait in this mode only as long as the clock y_1 does not exceed $\mathtt{UB}_1$ and the clock y_2 does not exceed $\mathtt{UB}_2$. This conjunctive constraint reflects the synchronization of the two component processes on timed actions. The mode can change in two ways depending on which component process produces the output first. If the second component issues its output

Q2: this switch. The clock-invariant in the mode FE is $(y_1 \leq \mathtt{UB}_1)$ since the second component does not impose any constraints on how long the process can wait in this mode. In the mode FE, if the first component produces its output, then the mode changes to EE, and if an input event is received, then the mode switches back to FF.

Q3: on delays determine the possible executions of this composite process. For example, if the upper bound $\mathtt{UB}_1$ is strictly smaller than the lower bound $\mathtt{LB}_2$, then in response to an initial input event, the first component is guaranteed to produce its output *before* the second component produces its output. That is, a mode-switch from the mode EE to the mode FF is guaranteed to be followed by the mode-switch to the mode EF since the guard condition $(y_2 \geq \mathtt{LB}_2)$ cannot be satisfied before the clock invariant $(y_1 \leq \mathtt{UB}_1)$ gets violated. Similarly,

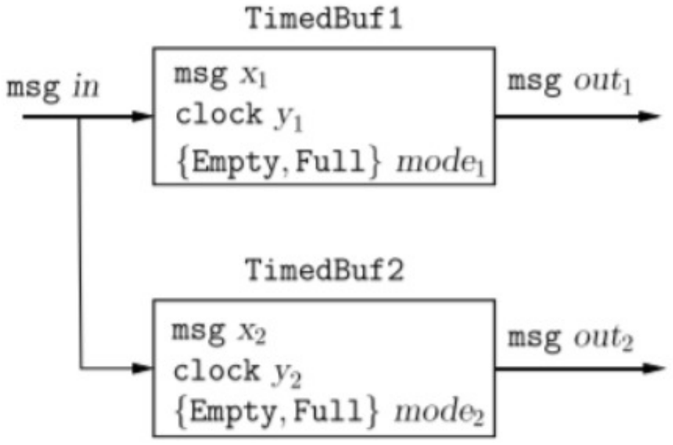

Figure 7.5: Composition of Two Instances of the Process TimedBuf

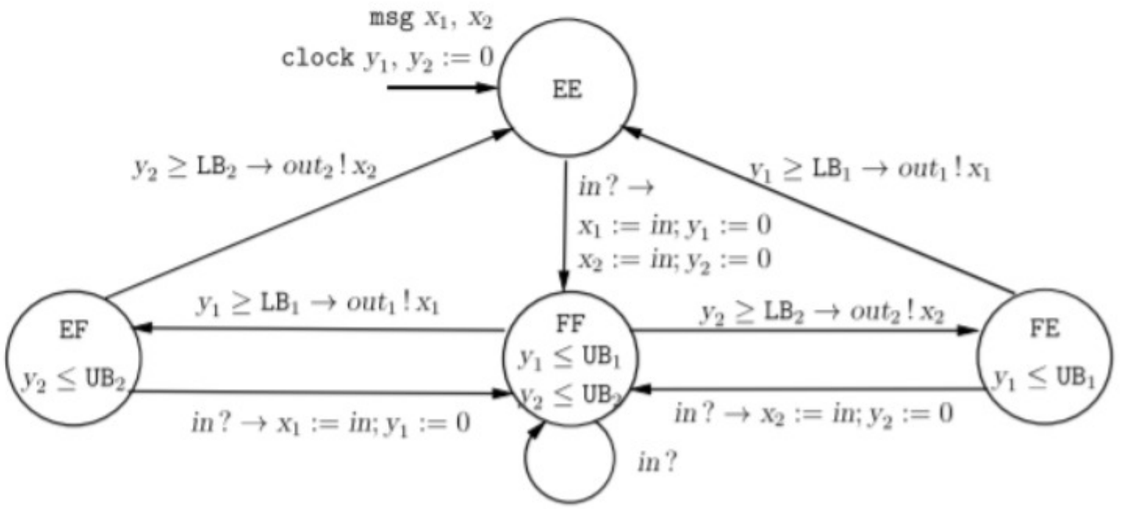

Figure 7.6: State Machine for Composition of Two TimedBuf Processes