



University of Limoges

**Internship report**  
Master 2 ACSYON

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**Title**

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Limoges, September 2025

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# Chapter I

## Open Automata

### 1 Open Automaton for Sliding Window Protocols

Description

- If the frame to send does not lie outside of the window, send this frame
- If the correct ACK is send, increase the window index by 1 and take modulo  $N$

We use a fix window size  $N$  and a limit waiting time  $T > 0$ . Variables are

- The window index  $w$
- The current frame's index  $i$
- The waited time  $t$

The Sender can dispatch **getFrame**, **send**, **wait**, **resend**. Meanwhile, the Receiver can dispatch **ack** when a frame is delivered correctly. Therefore, the transitions are as follows

$$\begin{aligned}
 s_1 &= \frac{\{\text{Sender} \mapsto \mathbf{getFrame}(i)\}(\text{True})\{\}}{q_0 \xrightarrow{\tau} q_0} \\
 s_2 &= \frac{\{\text{Sender} \mapsto \mathbf{send}(M[i])\}((i+1)\%N \neq w)\{i := (i+1)\%N\}}{q_0 \xrightarrow{\text{frameSent}} q_0} \\
 s_3 &= \frac{\{\text{Sender} \mapsto \mathbf{wait}\}((i+1)\%N = w \wedge t < T)\{t := t+1\}}{q_0 \xrightarrow{\tau} q_0} \\
 s_4 &= \frac{\{\text{Sender} \mapsto \mathbf{resend}(M[w])\}(t = T)\{t := 0\}}{q_0 \xrightarrow{\text{frameResent}} q_0} \\
 t_1 &= \frac{\{\text{Receiver} \mapsto \mathbf{ack}(M[w])\}(w \neq i)\{w := (w+1)\%N; t := 0\}}{q_0 \xrightarrow{\text{frameAked}} q_0}
 \end{aligned}$$

