

$$\begin{aligned}
\text{OLDCAR} &\stackrel{\text{def}}{=} \text{UNLOCKED} \\
\text{LOCKED} &\stackrel{\text{def}}{=} \text{green}.\tau.\text{UNLOCKED} + \tau.(\text{curse}.\text{LOCKED} + \text{LOCKED}) \\
&\quad + \text{red}.\text{LOCKED} \\
\text{UNLOCKED} &\stackrel{\text{def}}{=} \text{green}.\text{UNLOCKED} + \text{open}.\text{UNLOCKED} + \text{red}.\text{LOCKED}
\end{aligned}$$

4. (25 points) Write a CCS process ATTY to describe this attorney, using the following events (plus τ , as necessary):

$\{\text{meet}, \text{decline}, \text{accept}, \text{research}, \text{file}, \text{drop}, \text{trial}, \text{close}, \text{win}, \text{lose}, \text{mistrial}\}$

ANSWER:

$$\begin{aligned}
\text{ATTY} &\stackrel{\text{def}}{=} \text{meet}.\tau.\text{decline}.\text{ATTY} + \tau.\text{accept}.\text{PRETRIAL} \\
\text{PRETRIAL} &\stackrel{\text{def}}{=} \text{research}.\text{PRETRIAL} + \text{file}.\text{PRETRIAL} \\
&\quad + \tau.\text{drop}.\text{ATTY} + \text{trial}.\text{close}.\text{VERDICT} \\
\text{VERDICT} &\stackrel{\text{def}}{=} \text{win}.\text{collect}.\text{ATTY} + \text{lose}.\text{ATTY} + \text{mistrial}.\text{PRETRIAL}
\end{aligned}$$

5. (15 points) Let T, U, V , and W be the processes defined below:

$$\begin{aligned}
T &\stackrel{\text{def}}{=} c.\bar{b}.T + b.c.T \\
W &\stackrel{\text{def}}{=} d.X + c.Y \\
X &\stackrel{\text{def}}{=} \tau.(c.W + d.c.X) + c.\mathbf{0} \\
Y &\stackrel{\text{def}}{=} d.\mathbf{0} + \tau.(c.W + c.c.Y)
\end{aligned}$$

Give a process S that meets the following two conditions:

- S does not contain any τ transitions.
- $(S|T) \setminus \{b\}$ and W are equivalent (i.e., they have the same transition graph if you ignore the process names that appear on each node).

ANSWER: $S \stackrel{\text{def}}{=} d.\bar{b}.S + b.c.S$