# A Transition Rules

*Assignments*

$$(a_1)\qquad \frac{\mathcal{E}\,(\mathtt{x}) = [\![\tau]\!]_{\mathcal{E}}}{\langle \mathcal{E}, C_{\mathcal{S}}, \mathtt{x} = \tau\rangle \overset{c}{\twoheadrightarrow} \langle \mathbf{nothing}, \{\mathtt{x} = \tau\}, \{\}\rangle}$$

$$(a_2)\qquad \langle \mathcal{E}, C_{\mathcal{S}}, \mathbf{next}(\mathtt{x}) = \tau\rangle \overset{c}{\twoheadrightarrow} \langle \mathbf{nothing}, \{\mathbf{next}(\mathtt{x}) = \tau\}, \{\}\rangle$$

*Time Consuming Statements*

$$(p_1)\qquad \langle \mathcal{E}, C_{\mathcal{S}}, \mathbf{await\ clock}(C)\rangle \overset{c}{\twoheadrightarrow} \left\langle \begin{array}{l}\mathbf{immediate}\\ \mathbf{await\ clock}(C)\end{array}\ , \{\}, \{C\}\right\rangle$$

$$(p_2)\qquad \frac{c = C}{\left\langle \mathcal{E}, C_{\mathcal{S}}, \begin{array}{l}\mathbf{immediate}\\ \mathbf{await\ clock}(C)\end{array}\right\rangle \overset{c}{\twoheadrightarrow} \langle \mathbf{nothing}, \{\}, \{\}\rangle}$$

$$(p_3)\qquad \frac{c \neq C}{\left\langle \mathcal{E}, C_{\mathcal{S}}, \begin{array}{l}\mathbf{immediate}\\ \mathbf{await\ clock}(C)\end{array}\right\rangle \overset{c}{\twoheadrightarrow} \left\langle \begin{array}{l}\mathbf{immediate}\\ \mathbf{await\ clock}(C)\end{array}\ , \{\}, \{C\}\right\rangle}$$

*Clock Definitions*

$$(c_1)\qquad \frac{\mathcal{C} \neq \{\} \ \wedge\ \langle \mathcal{E}, C, \mathcal{S}\rangle \overset{c}{\twoheadrightarrow} \langle \mathcal{S}', \mathcal{A}, \mathcal{C}\rangle}{\langle \mathcal{E}, C_{\mathcal{S}}, \mathbf{clock}(C)\{\ \mathcal{S}\ \}\rangle \overset{c}{\twoheadrightarrow} \langle \mathbf{clock}(C)\{\ \mathcal{S}'\ \}, \mathcal{A}, \mathcal{C}\rangle}$$

$$(c_2)\qquad \frac{\mathcal{C} = \{\} \ \wedge\ \langle \mathcal{E}, C, \mathcal{S}\rangle \overset{c}{\twoheadrightarrow} \langle \mathcal{S}', \mathcal{A}, \mathcal{C}\rangle}{\langle \mathcal{E}, C_{\mathcal{S}}, \mathbf{clock}(C)\{\ \mathcal{S}\ \}\rangle \overset{c}{\twoheadrightarrow} \langle \mathcal{S}', \mathcal{A}, \mathcal{C}\rangle}$$

*Conditional Statements*

$$(i_1)\qquad \frac{[\![\sigma]\!]_{\mathcal{E}} = \mathsf{true} \ \wedge\ \langle \mathcal{E}, C_{\mathcal{S}}, \mathcal{S}_1\rangle \overset{c}{\twoheadrightarrow} \langle \mathcal{S}_1', \mathcal{A}_1, \mathcal{C}_1\rangle}{\langle \mathcal{E}, C_{\mathcal{S}}, \mathbf{if}(\sigma)\ \mathcal{S}_1\ \mathbf{else}\ \mathcal{S}_2\rangle \overset{c}{\twoheadrightarrow} \langle \mathcal{S}_1', \mathcal{A}_1, \mathcal{C}_1\rangle}$$

$$(i_2)\qquad \frac{[\![\sigma]\!]_{\mathcal{E}} = \mathsf{false} \ \wedge\ \langle \mathcal{E}, C_{\mathcal{S}}, \mathcal{S}_2\rangle \overset{c}{\twoheadrightarrow} \langle \mathcal{S}_2', \mathcal{A}_2, \mathcal{C}_2\rangle}{\langle \mathcal{E}, C_{\mathcal{S}}, \mathbf{if}(\sigma)\ \mathcal{S}_1\ \mathbf{else}\ \mathcal{S}_2\rangle \overset{c}{\twoheadrightarrow} \langle \mathcal{S}_2', \mathcal{A}_2, \mathcal{C}_2\rangle}$$

*Sequence*

$$(s_1)\qquad \frac{\mathcal{C}_1 \neq \{\} \ \wedge\ \langle \mathcal{E}, C_{\mathcal{S}}, \mathcal{S}_1\rangle \overset{c}{\twoheadrightarrow} \langle \mathcal{S}_1', \mathcal{A}_1, \mathcal{C}_1\rangle}{\langle \mathcal{E}, C_{\mathcal{S}}, \mathcal{S}_1\,;\ \mathcal{S}_2\rangle \overset{c}{\twoheadrightarrow} \langle \mathcal{S}_1'\,;\ \mathcal{S}_2, \mathcal{A}_1, \mathcal{C}_1\rangle}$$

$$(s_2)\qquad \frac{\mathcal{C}_1 = \{\} \ \wedge\ \langle \mathcal{E}, C_{\mathcal{S}}, \mathcal{S}_1\rangle \overset{c}{\twoheadrightarrow} \langle \mathcal{S}_1', \mathcal{A}_1, \mathcal{C}_1\rangle \ \wedge\ \langle \mathcal{E}, C_{\mathcal{S}}, \mathcal{S}_2\rangle \overset{c}{\twoheadrightarrow} \langle \mathcal{S}_2', \mathcal{A}_2, \mathcal{C}_2\rangle}{\langle \mathcal{E}, C_{\mathcal{S}}, \mathcal{S}_1\,;\ \mathcal{S}_2\rangle \overset{c}{\twoheadrightarrow} \langle \mathcal{S}_2', \mathcal{A}_1 \cup \mathcal{A}_2, \mathcal{C}_2\rangle}$$