CCS

Calculus of communicating systems

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Chemical Abstract Machine

A = ports/channels
$\mathfrak{L} = A \cup \overline{A}$ = labels
$Act = \mathfrak{L} \cup \{\tau\}$ = actions
τ - silent action

A ::= {coin, coffee, pub}
L ::= {coin, coffee, pub, $\overline{coin}, \overline{coffee}, \overline{pub}$}
Act ::= {coin, coffee, pub, $\overline{coin}, \overline{coffee}, \overline{pub}, \tau$}

LST - general operational semantics.

Labeled Transition System

LTS ::= $\langle Proc, Act, \{\xrightarrow{a} | a \in Act\}\rangle$.
Proc - set of all processes.
Act - set of all actions.
$\{\xrightarrow{a} | a \in Act\}$ - set of labeled transitions.

CCS grammar

P, Q $::= 0 \mid \alpha.P \mid P \mid Q \mid P + Q \mid P \setminus l(restriction) \mid P[l_1/l_0]$

0 - empty process

$\alpha.P$ - action, prefix

$P \mid Q$ - parallel composition

$P + Q$ - choice

$P \setminus l$ - restriction

$P[l_1/l_0]$ - renaming

CM - coffee machine
CS_h - honest computer scientist
CS_r - computer scientist
U - university

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$\mathrm{CM} ::= \mathrm{coin}.\overline{coffee}.CM$
$\mathrm{CS}_h ::= \overline{coin}.coffee.\overline{pub}.CS_h$
$\mathrm{CS}_r ::= \overline{coin}.coffee.\overline{pub}.CS_r + coffee.\overline{pub}.CS_r$

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$\mathrm{U} ::= \mathrm{CS}_h|CM|CS_r$

$$CS_0 ::= \overline{coin}.coffee.\overline{pub}.CS_0$$

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$$CS_1 ::= coffee.\overline{pub}.\overline{coin}.CS_1$$

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$$CS_2 ::= \overline{pub}.\overline{coin}.coffee.CS_2$$

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