Pirouette

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September 2023

1 Concrete Syntax

Locations	ℓ	$\in$	$\mathcal{L}$
Synchronization Labels	d	::=	**All Variables**
Integers	i	::=	**All Integers**
Strings	s	::=	**All Strings**
Boolean	b	::=	$true \mid false$
Variables	x	::=	**All Variables**
Binary Operations	$\odot$	::=	$+ \mid - \mid * \mid / \mid = \mid <= \mid >= \mid != \mid > \mid < \mid \&\& \mid \mid\mid$
Value	val	::=	$i \mid b \mid s$
Local Types	t	::=	**unit** $\mid$ **int** $\mid$ **string** $\mid$ **bool** $\mid t_1 \times t_2 \mid t_1 + t_2$
Local Expressions	e	::=	$() \mid val \mid x \mid e_1\ binop\ e_2 \mid$ **let** $x := e_1$ *in* $e_2 \mid (e_1, e_2) \mid$ **fst** e
		$\mid$	**snd** $e \mid$ **left** $e \mid$ **right** $e \mid$ **match** e **with** $[\ \mid p \to e_1\ ]^*$
Comments	*comments*	::=	**- -** $\mid$ **{- -}**
Declarations	D	::=	$F : \tau_1 \to \tau_2 \mid X : \tau \mid \ell.x : \ell.t \mid$ **type** $name := \tau$
Assignment	A	::=	$X := C \mid F\ P_1 \ldots P_n := C \mid \ell.x := C$
Declaration Block	*decl_block*	::=	$\cdot \mid D\ decl\_block \mid A\ decl\_block$
Local Patterns	p	::=	$\_ \mid val \mid x \mid (p_1, p_2) \mid left\ p \mid right\ p$
Patterns	P	::=	$\_ \mid x \mid (P_1, P_2) \mid \ell.p \mid left\ P \mid right\ P$
Choreographic Types	τ	::=	**unit** $\mid \ell.t \mid \tau_1 \to \tau_2 \mid \tau_1 \times \tau_2 \mid \tau_1 + \tau_2$
Choreography	C	::=	$() \mid X \mid \ell.e \mid \ell_1.e \rightsquigarrow \ell_2.x;\ C \mid C[\ell_1] \rightsquigarrow \ell_2$
		$\mid$	**if** C_1 **then** C_2 **else** C_3
		$\mid$	$\ell_1[d] \rightsquigarrow \ell_2;\ C \mid$ **let** *decl_block* **in** C
		$\mid$	**fun** $X \to C \mid C_1\ C_2$
		$\mid$	$(C_1, C_2) \mid$ **fst** $C \mid$ **snd** $C \mid$ **left** $C \mid$ **right** C
		$\mid$	**match** C **with** $[\ \mid P \to C_1\ ]^*$
Network Types	t_N	::=	$t \mid t_{N1} \to t_{N2} \mid t_{N1} \times t_{N2} \mid t_{N1} + t_{N2}$
Network Expressions	E	::=	$X \mid () \mid$ **fun** $X \to E \mid E_1\ E_2 \mid \mathsf{ret}(e)$
		$\mid$	$\mathsf{let}\ \mathsf{ret}(x) := E_1\ \mathsf{in}\ E_2 \mid \mathsf{send}\ e\ \mathsf{to}\ \ell;\ E \mid \mathsf{receive}\ x\ \mathsf{from}\ \ell;\ E$
		$\mid$	$\mathsf{if}\ E_1\ \mathsf{then}\ E_2\ \mathsf{else}\ E_3 \mid \mathsf{choose}\ d\ \mathsf{for}\ \ell;\ E$
		$\mid$	$\mathsf{allow}\ \ell\ \mathsf{choice}\ [\ \mid d \to E\ ]^* \mid (E_1, E_2)$
		$\mid$	**fst** $E \mid$ **snd** $E \mid$ **left** $E \mid$ **right** E
		$\mid$	**match** E **with** $[\ \mid p \to E_1\ ]^*$
Program	ρ	::=	*decl_block*