MODULE *UniswapCode*

EXTENDS *Integers*, *FiniteSets*

CONSTANT X, Y, L

ASSUME $X \in Int \land X > 0$
ASSUME $Y \in Int \land Y > 0$
ASSUME $L \in Int \land L > 0$

VARIABLE S

$$
\begin{array}{l}
TradeX \triangleq \\
\quad \exists\, x \in Int : \\
\qquad \land\, x > 0 \\
\qquad \land\, S' = \langle \\
\qquad\quad S[1] + x, \\
\qquad\quad S[2] - (x * S[2]) \div (S[1] + x), \\
\qquad\quad S[3] \rangle
\end{array}
$$

$$
\begin{array}{l}
TradeY \triangleq \\
\quad \exists\, y \in Int : \\
\qquad \land\, y > 0 \\
\qquad \land\, S' = \langle \\
\qquad\quad S[1] - (y * S[1]) \div (S[2] + y), \\
\qquad\quad S[2] + y, \\
\qquad\quad S[3] \rangle
\end{array}
$$

$$
\begin{array}{l}
Trade \triangleq \\
\quad \lor\, TradeX \\
\quad \lor\, TradeY
\end{array}
$$

$$
\begin{array}{l}
AddLiquidity \triangleq \\
\quad \exists\, x \in Int : \\
\qquad \land\, x > 0 \\
\qquad \land\, S' = \langle \\
\qquad\quad S[1] + x, \\
\qquad\quad S[2] + (x * S[2]) \div S[1] + 1, \\
\qquad\quad S[3] + (x * S[3]) \div S[1] \rangle
\end{array}
$$

$$
\begin{array}{l}
DelLiquidity \triangleq \\
\quad \exists\, l \in Int : \\
\qquad \land\, l > 0
\end{array}
$$

$\land\ l < S[3]$
$\land\ S' = \langle$
$S[1] - (l * S[1]) \div S[3],$
$S[2] - (l * S[2]) \div S[3],$
$S[3] - l\rangle$

$Liquidity \triangleq$
$\lor\ AddLiquidity$
$\lor\ DelLiquidity$

$Init \triangleq S = \langle X,\ Y,\ L\rangle$

$Next \triangleq$
$\lor\ Trade$
$\lor\ Liquidity$

$Spec \triangleq Init \land \Box[Next]_S$

\ * Modification History
\ * Last modified *Tue Apr* 07 17:18:21 *CST* 2020 by user
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