MODULE *pluscal_triselection*

EXTENDS *TLC*, *Integers*, *Naturals*

CONSTANTS $n0$

$n \triangleq 5$

$t0 \triangleq [k \in 0 \,..\, n-1 \mapsto$
IF $k = 0$ THEN 3
ELSE IF $k = 1$ THEN 6
ELSE IF $k = 2$ THEN $2 * k$
ELSE IF $k = 3$ THEN 9
ELSE 5]

```
--algorithm triselection{
variables i, mini, j, x, t ;
{
    t := t0 ;
    i := 0 ;
    while ( i < n )
    {
        mini := i ;
        j := i ;
        while ( j <  n )
        {
            if ( t[j] < t[mini] )
            {
                mini := j ;
                  } ;
            x := t[i] ;
            t[i] := t[mini] ;
            t[mini] := x ;

            j := j + 1 ;
         } ;
        i := i + 1 ;
     }
 }

 }
```

BEGIN TRANSLATION

CONSTANT *defaultInitValue*

VARIABLES $i$, *mini*, $j$, $x$, $t$, *pc*

$vars \triangleq \langle i, mini, j, x, t, pc \rangle$

$Init \triangleq$ Global variables
$\wedge\, i = defaultInitValue$

$\land\ mini = defaultInitValue$
$\land\ j\ = defaultInitValue$
$\land\ x = defaultInitValue$
$\land\ t\ = defaultInitValue$
$\land\ pc = \text{“Lbl\_1”}$

$Lbl\_1 \triangleq$
$\land\ pc = \text{“Lbl\_1”}$
$\land\ t' = t0$
$\land\ i' = 0$
$\land\ pc' = \text{“Lbl\_2”}$
$\land$ UNCHANGED $\langle mini,\ j,\ x\rangle$

$Lbl\_2 \triangleq$
$\land\ pc = \text{“Lbl\_2”}$
$\land$ IF $i < n$
THEN $\land\ mini' = i$
$\land\ j' = i$
$\land\ pc' = \text{“Lbl\_3”}$
ELSE $\land\ pc' = \text{“Done”}$
$\land$ UNCHANGED $\langle mini,\ j\rangle$
$\land$ UNCHANGED $\langle i,\ x,\ t\rangle$

$Lbl\_3 \triangleq$
$\land\ pc = \text{“Lbl\_3”}$
$\land$ IF $j <\ n$
THEN $\land$ IF $t[j] < t[mini]$
THEN $\land\ mini' = j$
ELSE $\land$ TRUE
$\land\ mini' = mini$
$\land\ x' = t[i]$
$\land\ t' = [t$ EXCEPT $![i] = t[mini']]$
$\land\ pc' = \text{“Lbl\_4”}$
$\land\ i' = i$
ELSE $\land\ i' = i + 1$
$\land\ pc' = \text{“Lbl\_2”}$
$\land$ UNCHANGED $\langle mini,\ x,\ t\rangle$
$\land\ j' = j$

$Lbl\_4 \triangleq$
$\land\ pc = \text{“Lbl\_4”}$
$\land\ t' = [t$ EXCEPT $![mini] = x]$
$\land\ j' = j + 1$
$\land\ pc' = \text{“Lbl\_3”}$
$\land$ UNCHANGED $\langle i,\ mini,\ x\rangle$

$Next \triangleq\ Lbl\_1 \lor Lbl\_2 \lor Lbl\_3 \lor Lbl\_4$
$\lor$ Disjunct to prevent deadlock on termination
$(pc = \text{“Done”} \land$ UNCHANGED $vars)$

$Spec \triangleq\ Init \land \Box[Next]_{vars}$

$Termination \triangleq \Diamond(pc = \text{“Done”})$

END TRANSLATION