
MODULE *NAlternatingTurns*

EXTENDS *Integers, Sequences, TLC*

CONSTANT *N*

```

*****
NonCriticalSection  $\leftarrow$  |
|                               |
| v                             |
Enter                |
|                               |
|                               |  $\forall$  processes they in cyclic activity iterate over
|                               | these states, which are not essentially atomic
| v                             |
CriticalSection      |
|                               |
|                               |
| v                             |
Exit _____ |
*****

```

```

--algorithm NAlternatingTurns{
  variables
    processes = 0 .. (N - 1),
    turn  $\in$  processes ;

    process ( p  $\in$  processes ) {
      ncs:   while ( TRUE ) {
              skip ;
            enter:   await turn = self ;
            cs:     skip ;
            exit:   turn := (turn + 1)%N ;
              }
    }
}

BEGIN TRANSLATION (chksum(pcal) = "7a3bcd04"  $\wedge$  chksum(tla) = "3bd35e38")
VARIABLES processes, turn, pc

vars  $\triangleq$   $\langle$ processes, turn, pc $\rangle$ 

ProcSet  $\triangleq$  (processes)

Init  $\triangleq$  Global variables
 $\wedge$  processes = 0 .. (N - 1)
 $\wedge$  turn  $\in$  processes
 $\wedge$  pc = [self  $\in$  ProcSet  $\mapsto$  "ncs"]

ncs(self)  $\triangleq$   $\wedge$  pc[self] = "ncs"
 $\wedge$  TRUE
 $\wedge$  pc' = [pc EXCEPT ![self] = "enter"]
 $\wedge$  UNCHANGED  $\langle$ processes, turn $\rangle$ 

```

$$\begin{aligned}
enter(self) &\triangleq \wedge pc[self] = \text{"enter"} \\
&\quad \wedge turn = self \\
&\quad \wedge pc' = [pc \text{ EXCEPT } ![self] = \text{"cs"}] \\
&\quad \wedge \text{UNCHANGED } \langle processes, turn \rangle \\
cs(self) &\triangleq \wedge pc[self] = \text{"cs"} \\
&\quad \wedge \text{TRUE} \\
&\quad \wedge pc' = [pc \text{ EXCEPT } ![self] = \text{"exit"}] \\
&\quad \wedge \text{UNCHANGED } \langle processes, turn \rangle \\
exit(self) &\triangleq \wedge pc[self] = \text{"exit"} \\
&\quad \wedge turn' = (turn + 1) \% N \\
&\quad \wedge pc' = [pc \text{ EXCEPT } ![self] = \text{"ncs"}] \\
&\quad \wedge \text{UNCHANGED } processes \\
p(self) &\triangleq ncs(self) \vee enter(self) \vee cs(self) \vee exit(self) \\
Next &\triangleq (\exists self \in processes : p(self)) \\
Spec &\triangleq Init \wedge \Box [Next]_{vars}
\end{aligned}$$

END TRANSLATION

\ * Modification History
\ * Last modified Tue Mar 12 15:32:06 CET 2024 by jeujeus
\ * Created Tue Mar 12 15:11:32 CET 2024 by jeujeus