

EXTENDS *Integers*

CONSTANT  $N$

ASSUME  $(N \in Nat) \wedge (N > 0)$

$a \oplus b \triangleq (a + b) \% 2$

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```
--algorithm HSClock{
  variable  $ca = [i \in 0 \dots (N - 1) \mapsto 0]$ ;

  process (  $Proc0 = 0$  )
  {  $t$ : while ( TRUE )
    { await  $ca[0] = ca[N - 1]$ ;
       $ca[0] := ca[0] \oplus 1$ 
    }
  }

  process (  $Proc \in 1 \dots (N - 1)$  )
  {  $t$ : while ( TRUE )
    { await  $ca[self] \neq ca[self - 1]$ ;
       $ca[self] := ca[self] \oplus 1$ 
    }
  }
}
```

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BEGIN TRANSLATION

Label  $t$  of process  $Proc0$  at line 12 col 11 changed to  $t_$

VARIABLE  $ca$

$vars \triangleq \langle ca \rangle$

$ProcSet \triangleq \{0\} \cup (1 \dots (N - 1))$

$Init \triangleq$  Global variables  
 $\wedge ca = [i \in 0 \dots (N - 1) \mapsto 0]$

$Proc0 \triangleq$   $\wedge ca[0] = ca[N - 1]$   
 $\wedge ca' = [ca \text{ EXCEPT } ![0] = ca[0] \oplus 1]$

$Proc(self) \triangleq$   $\wedge ca[self] \neq ca[self - 1]$   
 $\wedge ca' = [ca \text{ EXCEPT } ![self] = ca[self] \oplus 1]$

$Next \triangleq Proc0$   
 $\vee (\exists self \in 1 \dots (N - 1) : Proc(self))$

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

END TRANSLATION

$$\begin{aligned}
cBar &\triangleq \text{ IF } \exists i \in 1 \dots (N-1) : ca[i] \neq ca[i-1] \\
&\quad \text{ THEN CHOOSE } i \in 1 \dots (N-1) : ca[i] \neq ca[i-1] \\
&\quad \text{ ELSE } 0 \\
CS &\triangleq \text{ INSTANCE } ClockSpec \text{ WITH } c \leftarrow cBar
\end{aligned}$$


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