MACHINE m2
REFINES m1
SEES c0
VARIABLES

wait
process
cs
clk
t1
t2
qsize
queue

INVARIANTS

inv1: $qsize \in \mathbb{N}$
inv2: $queue \in 1 \mathinner{..} qsize \rightarrowtail\!\!\!\!\!\rightarrow wait$

EVENTS

Initialisation ⟨extended⟩

begin

act1: $wait := \varnothing$
act2: $process := \varnothing$
act3: $cs := \varnothing$
act4: $clk := 0$
act5: $t1 := \varnothing$
act6: $t2 := \varnothing$
act7: $qsize := 0$
act8: $queue := \varnothing$

end

Event wish ⟨ordinary⟩ $\widehat{=}$
extends wish

any

pro

where

grd1: $pro \in PROCESS \setminus wait$
grd2: $pro \in PROCESS \setminus process$

then

act1: $wait := wait \cup \{pro\}$
act2: $t1(pro) := clk$
act3: $queue(qsize + 1) := pro$
act4: $qsize := qsize + 1$

end

Event enter ⟨ordinary⟩ $\widehat{=}$
extends enter

any

pro
i

where

grd1: $pro \in wait$
grd2: $i \in 1 \mathinner{..} csnum$
grd3: $i \notin ran(cs)$
grd4: $qsize > 0$
grd5: $pro = queue(1)$

then

act1: $wait := wait \setminus \{pro\}$
act2: $process := process \cup \{pro\}$
act3: $cs(pro) := i$
act4: $t2(pro) := clk$

act5: $queue :| queue' \in 1 \mathinner{..} qsize - 1 \rightarrowtail\!\!\!\!\!\!\rightarrow wait \setminus \{queue(1)\} \land (\forall j \cdot j \in 1 \mathinner{..} qsize - 1 \Rightarrow queue'(j) = queue(j+1))$

act6: $qsize := qsize - 1$

end

Event leave ⟨ordinary⟩ $\widehat{=}$

extends leave

any

pro

where

grd1: $pro \in process$

then

act1: $process := process \setminus \{pro\}$

act2: $cs := \{pro\} \lhd cs$

end

Event tick ⟨ordinary⟩ $\widehat{=}$

extends tick

when

grd1: $\forall p \cdot (p \in wait \land p \in dom(t1)) \Rightarrow clk + 1 - t1(p) \leq ddl1$

then

act1: $clk := clk + 1$

end

END