

MACHINE m2

REFINES m1

SEES c0

VARIABLES

wait
process
clk
t1
t2
qsize
queue

INVARIANTS

inv1: $qsize \in \mathbb{N}$
inv2: $queue \in 1 .. qsize \mapsto wait$

EVENTS

Initialisation $\langle \text{extended} \rangle$

begin

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

end

Event wish $\langle \text{ordinary} \rangle \hat{=}$

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 $\langle \text{ordinary} \rangle \hat{=}$

extends enter

any

pro

where

grd1: $pro \in wait$
grd2: $card(process) = 0$
grd3: $qsize > 0$
grd4: $pro = queue(1)$

then

act1: $wait := wait \setminus \{pro\}$
act2: $process := process \cup \{pro\}$
act3: $t2(pro) := clk$
act4: $queue :| queue' \in 1 .. qsize - 1 \mapsto wait \setminus \{queue(1)\} \wedge (\forall i \cdot i \in 1 .. qsize - 1 \Rightarrow queue'(i) = queue(i + 1))$
act5: $qsize := qsize - 1$

end

Event leave $\langle \text{ordinary} \rangle \hat{=}$

```
extends leave
  any
    pro
  where
    grd1: pro  $\in$  process
  then
    act1: process := process \ {pro}
  end
Event tick  $\langle$ ordinary $\rangle \hat{=}$ 
extends tick
  when
    grd1:  $\forall p. (p \in \textit{wait} \wedge p \in \textit{dom}(t1)) \Rightarrow \textit{clk} + 1 - t1(p) \leq \textit{ddl1}$ 
  then
    act1: clk := clk + 1
  end
END
```